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ABSTRACT

The Australian National Library has responsibility for the development of bibliographic services in Australia. This study is a draft document designed to facilitate discussion of the concept of a national bibliographic support system. It considers the feasibility of a national on-line cataloging system to reduce costs and provide output products. The following aspects are outlined: (1) aims and objectives of the proposed system; (2) system constraints; (3) data base composition and control; (4) system outputs; (5) system management; (6) training and consultative services; (7) computing system; (8) network administration and management; (9) implementation plan; (10) cost/benefits; and (11) charging. Supportive data and a questionnaire on national shared cataloging systems are included in the appendices. (KP)

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NATIONAL LIBRARY OF AUSTRALIA

DEVELOPMENT OF RESOURCE SHARING NETWORKS STUDIES

In the framework of UNISIST (World Science Information System), NATIS (National Information Systems) and ALBIS (Australian Library Based Information System)

NETWORKS STUDY NO. 2

BIBDATA NETWORK: A DRAFT PROPOSAL FOR AN AUSTRALIAN NATIONAL SHARED CATALOGUING SYSTEM

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GLOSSARY OF TERMS

Access points
Bibliographic records on the database may be indexed by a number of elements within them such as ISBN, author, words in the title etc. Such elements then become access points by which a particular record or a set of records may be retrieved from the database.

AMRS
Australian MARC Record Service -- an existing service in batch mode allowing retrieval of particular records from a data base of MARC records using a limited number of access points and giving output on magnetic tape.

Archive file
While records are being dispensed to users, copies may also be held at the central site. A collection of all such copies for a particular user would constitute his archive file.

AUSMARC
The version of the MARC (Machine-Readable Cataloguing) bibliographic record format used for data interchange.

Cataloguing transaction
The full action of cataloguing an item by use of the BIBDATA system, whether by original cataloguing or by copy cataloguing.

Compaction
A method of compacting machine-held data by the removing of superfluous characters such as blanks.

Control fields
Sets of characters within the MARC record which indicate the type of data which follows. Three types of control fields are used viz. tags, indicators and sub-field codes.

Functional specification
A specification of the functional requirements of a system i.e. a specification of <u>what</u> is required of the system, preliminary to a more detailed specification of <u>how</u> the system is to accomplish these requirements.

Hold-queue
In an on-line system material may be held in a queue in temporary storage awaiting favourable circumstances to resume processing.

Look-up tables
A common programming technique whereby the computer

program reads in or builds up tables of information and refers to these during processing.

National agency record
: A record received in a MARC format from a national agency such as Library of Congress, British Library, National Library of Canada etc.

Regional processing centres
: Computer installations which perform processing on individual data records either held at the site or delivered from a remote site via telecommunications links.

Remote concentrator
: A stored program computer installed in a network at a point remote from the central site, and used to aggregate data from a number of discrete lines and pass them down a single line to the central site.

Resolution
: The degree of detail into which a record format is divided e.g. a format having separate 'fields' or data areas for Place, Publisher and Date is said to have a greager degree of resolution than one allowing only a single field for Imprint.

Scroll
: The act of calling for the display screen which notionally precedes or succeeds the one currently displayed, as if turning a page.

Search-key
: See Truncated author/title search-key.

Sign-on code
: A code containing identification information. Terminal users would 'unlock' the system by supplying their personal sign-on codes which in turn would allow the system to look up their stored user profile and supply options chosen in this profile e.g. to supply output in catalogue card form etc.

Standard computer stationery
: Common line-printer stationery is continuous sheets of paper approx. 11 by 13.5 inches allowing 60 lines of 133 characters per line.

Sub-record
: A group of data logically attached to another group under some form of dependency e.g. bibliographic data for a title may be gathered as one record with particular shelf-list data for each holder of the title being held in separate sub-records attached to the main

bibliographic record.

System number
A number assigned by the system and subsequently used as a control number

System status
The degree of system availability for acceptance of processing tasks.

Tags
The variable-length MARC record is divided into data areas or 'fields' by the use of 3-digit tags e.g. the numbers 110 indicate the beginning of a corporate author field.

Telecommunication protocols
A set of rules and procedures for transmitting machine-readable data over telecommunication lines.

Truncated author/title search-key
An alphabetic form of access to records on a bibliographic data base by use of a search key constructed from letters taken from the author and title of the work.

INTRODUCTION

The National Library, under its Act, has a duty to foster and develop national bibliographic services in Australia. In accordance with this requirement resources have been expended in the preparation of a proposal for a national bibliographic support system (BIBDATA).

The need for such a system was recognised by the National Library Council as early as 1972. Due to problems of resource availability and as a result of more pressing needs progress in the development of the system has been slow. Early in 1975 a study team was formed to examine and report on the feasibility and likely cost of a national bibliographic support system. This study has now been completed. The report which has been produced is a draft report designed to facilitate discussion of the concept by interested parties. It is a working document and as such may be subject to amendment as a result of discussions held.

The creation of a national system such as BIBDATA is considered by the National Library Council to be a very important goal. However, it is not possible to achieve such a system within current resource availability. Therefore, in order to develop the network proposed, there will need to be clear support of the proposal by the Federal Government. It is the intention that such support be sought from the Government.

1.0 AIMS AND OBJECTIVES OF THE PROPOSED SYSTEM

1.1 This document proposes the creation of an on-line national bibliographic support system to be known as BIBDATA. The aims of the system are:-

AIM 1

Reduce the rate of increase in the cost of cataloguing and increase the ability of libraries to respond to needs of users.

OBJECTIVES

In order to achieve this aim the system must meet the following objectives:

- provide access in both batch and on-line mode to a comprehensive data base of bibliographical records.

- provide for input of National agency MARC records from magnetic tape;

- provide for the input by participants of original cataloguing data in on-line mode;

- enable the retrieval of individual bibliographic records using any one of a number of access points which would include:-

  - control number (ISBN, BNB number, LC card number, system number, other control numbers),

  - author;

  - truncated author/title;

  - truncated title;

  - title keyword;

  - classification (LC and DC);

  - subject,

  - series.

- provide a variety of output products including catalogue card sets, bibliographic records on magnetic tape and microform.

- provide on-line access to national authority files and user call number data;

- permit creation of a library-specific version of a standard bibliographic record and retain that version in machine readable form on the users own archive file;

- permit on-line recall and amendment of user archive data if required.

AIM 2

To provide the means for the development of efficient resource sharing by Australian libraries.

OBJECTIVES

In order to meet this second aim the system must be capable of:

- maintaining on-line holdings records for materials catalogued using the on-line system;

- maintaining holdings information for materials held by libraries who are not participants in the on-line system;

- providing access to the various locations of particular documents;

- providing facilities for the requesting of the loan of documents.

Note. The objective relating to the maintenance of holdings records for materials held by libraries other than BIBDATA participants is met outside the system and is not addressed in this document.

2.0 SYSTEM CONSTRAINTS

2.1 The amount of resource available for the development of the system clearly affects the speed with which the aims and objectives can be achieved. Particular factors which have a bearing on the rate of implementation of the system are:

- the availability of manpower resources;
- the availability of funds;
- the number of users to be serviced by the system;
- the geographic spread of these users.

2.2 Considerations such as those outlined above necessitate a phased approach to development of the system.

3.0 DATA BASE COMPOSITION AND CONTROL

3.1 The data base will comprise the following logical files:

- Bibliographic files;
- Location files;
- BIBDATA Authority files;
- Call number files;
- Archive files.

3.2 Bibliographic Files

3.2.1 Major sources of bibliographic data. The major source of bibliographic data to be used in the data base creation and maintenance will be:

- LC MARC records;
- UK MARC records;
- AUSMARC records;
- CAN/MARC records.

3.2.2 Operational monitoring of demand and data base usage will determine the adequacy of the coverage provided. Other national agency MARC services may be added to meet demonstrated needs. There may be a need to make available data from retrospective conversion projects which have been undertaken in Australia or overseas (eg University of California, Union Catalogue Supplement and UK MARC backfile).

3.2.3 Once the on-line system is operational the data base will also accept originally entered cataloguing data from participating libraries where no record for the particular title could be located on the data base. The input format for these records must conform to the AUSMARC standard, however two levels of cataloguing completeness are envisaged thereby allowing those libraries who have no requirement for the full cataloguing details to enter a record with a limited number of MARC elements.

3.2.4 Relationship of national agency records to shared cataloguing records. The data base consists of bibliographic records received from a number of sources. Situations will arise where national agency

data is received in respect of an item which is already held on the base. There must be procedures to resolve this conflict. It is recommended that the conflict be resolved by replacing the shared cataloguing record by the national agency record but with the retention of all location data. User records displaced in this manner will have to be transferred to the archive file.

3.2.5 Problems of file size. The bibliographic file is a growing entity. As it is expected that there will be a large number of records on the data base which will never be used, there will be a need to cull the on-line file. This can be achieved by segmenting the data base with unused records received prior to a particular date being transferred to a secondary storage medium. This secondary file could be made available for short periods at scheduled times.

3.2.6 Duplication of national agency records. A decision needs to be made on whether to include duplicate national agency records in the data base. A duplicate national agency record is defined as the case where two or more national agencies have catalogued the identical title. If duplicate titles are to be retained on the data base then there will be:

- an increase in file size: a study recently conducted at the National Library (Appendix A) indicated that inclusion of duplicate LC and BNB cataloguing records would increase the data base volume by approximately 14%;

- difficulty in providing complete holdings information for particular titles;

- maximisation of the problems of maintaining authority file consistency.

However, by retaining duplicate records, users of the system have a free choice of cataloguing data which will facilitate the continuance of their current cataloguing practice.

3.3 Location files

The system will, as an automatic by-product of a cataloguing operation, update location files with the location data relating to the cataloguing library. There will be maintained existing card file procedures to record location data relating to non-BIBDATA participants.

3.4 BIBDATA authority files

3.4.1 Authority file types. Full authority file control

is envisaged for Name and Series authority files so far as they relate to data base records which have been used by a participant. In the early stages of the system it is proposed to supply 'reference only' Subject authority files. However there will be provision for users to add entries to the Subject authority file. User entered subject headings are seen as applying to new subject entries which are not yet available on the LCSH file. Users wishing to add to or amend the Subject authority file in any way should submit their changes to the central authority file control group for actioning. Regular LCSH Supplements will also be updated onto the file.

3.4.2 Name and Series authority files. The following more detailed explanation of the proposed authority file concept applies immediately to Name and Series authority files. The general principle proposed is that national authority files should be created by automatic generation of entry points from records as they are used for cataloguing and by shared quality control procedures.

3.4.3 Alternatives examined. Other alternative approaches were examined and discarded. Briefly these were:

- Bulk loading of authority files by automatic generation from ALL records, regardless of use, as these are added to the bibliographic data base. However a survey conducted at NLA on titles catalogued by both LC and BNB showed a 34% disagreement in the name forms used. While this was mainly in the area of fullness of forenames, it does indicate that bulk-loading the authority files when adding new national agency tapes to the base could lead to problems of consistency.

- Automatic loading of entries AS USED, but with an automatic streaming of all records containing new entries to an authority file maintenance section for checking. Quantification of this concept revealed an unacceptably large staff requirement at NLA, and a potential bottleneck in the smooth flow of material in the system.

- Library specific authority files were also considered but the provision of a large number of individual files is undesirable in a centralised data base. Such files were thought to be more appropriate to regional processing locations.

3.4.4 Authority file records would contain the usual elements such as entry form, reference forms and

history notes. The conventions of the Anglo-American cataloguing rules would be followed. One consistent national file would be held without catering for different forms held by individual libraries. Participants would, of course, be free to disagree with the national authority files in editing their own records for output; however, the files could then obviously no longer be used as the library's authority file but as an advisory tool only.

3.4.5 On-line access to the national authority files would be available at all times. A section of the file around the item requested would be displayed.

3.4.6 Quality control of authority files. Points to be considered in regard to quality control are:

- Shared quality control responsibility. All records originally entered by participants should be consistent with the national authority files. Users may also, of course, edit their own records to produce non- standard output. Where a record is found on the base the first user of the record (i.e. no library locations present) would have the responsibility to check the record fully for acceptability as a data base record.

- Changing the record. Errors and additions (i.e. additional references to established headings) would be reported on the appropriate message screens for amendment by the BIBDATA data base maintenance section. Such authority file amendments would also trigger off 'global' changes to the bibliographic data base where necessary, i.e. all records using the amended entry form will be amended.

- It follows from the above that where a library is using the BIBDATA authority files as its own authority files it should not need to check any data base record which has already been used by another library, although it would, of course, be free to do so.

3.5 Call number files

3.5.1 It is proposed that there be no on-line shelf-lists as such in the BIBDATA system where such shelf-lists would imply files of bibliographical records arranged and accessed by call number with a separate file for each participant library.

3.5.2 However, in keeping with the general principle

that BIBDATA allow the full cataloguing operation to be performed at the terminal without the need to consult local files, on-line aid should be given to GUARANTEE THE UNIQUENESS OF THE CALL NUMBER in respect to new titles and duplicate titles.

3.5.3 Duplicates. Where a title is being searched against the data base, is found, and is found to already contain the location of the searching library, the system will display not only the bibliographical record but also an attached sub-record containing the particular library's call number details such as class no., author mark, copy no., run identification, branch no., edition information and other call number extensions. The terminal operator may then supply additional information from among these categories to update the sub-record with or without requesting output, and may construct a unique call number from the information displayed.

3.5.4 New titles. Where a copy is found to be the first of this title acquired by the library and cataloguing is entered to the system, whether copy cataloguing from a data base record or original cataloguing, then the system should be able to check the uniqueness of the call number constructed by the user. Where the call number entered is not unique within their own library then the system will notify the operator of this fact. In the case of such notification the call number can be extended and the record resubmitted.

3.6 Archive files.

3.6.1 An archiving facility will be supplied. This means that an individual library's copy of its record would be kept, containing the record in its final form from which output was requested - i.e. including local call numbers, accession numbers, other local data, bibliographical editing changes to the record etc.

3.6.2 Some potential uses for such files are:

In off-line mode:

- for backup protection against irretrievable damage to the locally held file

- as a basis for a future automation project ie. machine-readable records can be collected while a more traditional output (such as catalogue cards) is still being used.

- as a basis for periodic cumulations of book or microform catalogues.

In on-line mode:

- as a control tool in the daily operations cycle, for example to maintain consistency with previous cataloguing and allow amendment of archive records

- as a basis for full on-line catalogues.

4.0 SYSTEM OUTPUTS

4.1 Output from the BIBDATA system will be produced in a number of forms. It will fall into the following broad groups:

- terminal output;
- output on magnetic media;
- output on hardcopy media.

4.2 Products to be provided will cover individual bibliographic records, authority files and shelf lists as well as a variety of system control information. The form of output will vary from product to product.

4.3 The following basic outputs will be provided by the system:

4.3.1 Terminal Output (VDU Display or Hardcopy):

- bibliographic data for individual records in short form;
- bibliographic data for individual records in full form;
- authority file entries for name, series and subject authority files;
- location information for a particular bibliographic record;
- system status, and general informatory messages.

4.3.2 Magnetic Media Output:

- individual bibliographic records in AUSMARC format;
- archive records in AUSMARC format;
- individual authority file records for name, series and subject authority file entries;
- catalogue card images.

4.3.3 Hardcopy Output:

- catalogue cards as required by users in a

limited range of format options options;

- authority file entries on catalogue cards

- library accessions list of recent additions

- Classified and Dictionary COM catalogues each in a standard format

- circulation control stationary

- location file on Computer Output Microfilm

4.4 The exact formats of the various output products will need to be determined. However bibliographic data records on magnetic tape will be in the AUSMARC format. Estimates of volumes for each class of magnetic media and hard-copy output are given in Appendix D.

4.5 Users will have the option of capturing output at their own location by use of a cassette interface on the terminal. Terminals will be basically visual display devices.

4.6 In the initial stages of the system, output will be produced in one of two places. It may be produced either at the central site or at the terminal itself. Products at:

4.6.1 Central Site:

- all hardcopy output;

- catalogue card output in print format form on magnetic media;

- AUSMARC records on magnetic media;

4.6.2 User Site:

- all terminal output;

- AUSMARC records on cassette magnetic media;

4.7 Output to magnetic media will be made according to system standards to be specified. These standards will define requirements or options in the areas of tape/cassette labels, tape densities and reel numbering for example.

4.8 It is envisaged that as system usage grows there will be a move toward production of system outputs at regional locations. This question is addressed in section 9 of this document.

4.9 User options. Users of the system will have the option of specifying the type of output they require and the medium on which it is to be produced. This facility will be implemented through a user profile which will contain data relating to the requirements of the individual institution. The profile may be changed at the users direction but the change will be made by central site operations staff. The information contained in the profile will indicate, for example, how many sets of catalogue cards are required for each request to produce cards, whether the user wishes to automatically receive an authority file set on first use of an authority file entry, and whether automatic updating of the authority file set is required if and when an entry used by that institution is changed in response to an authority file error report by that or any other institution.

4.10 Individual authority file records will be supplied on magnetic tape in AUSMARC format. Exact details of this format have yet to be determined.

4.11 Output of statistical data. At regular intervals, probably weekly, each user of the system will receive a statistical summary of system resource usage for the period subject to analysis. This output will be on standard computer stationery. The information contained on these reports will be used as the basis for customer billing. The summary will be divided into two sections. One section will deal with the system activity of the individual user and will contain the following information:

- number of original catalogue records added;
- number of copy catalogue records added (i.e. the number of existing records to which a location symbol has been added);
- the percentage of copy cataloguing as related to total cataloguing;
- total cataloguing inputs to the system;
- elapsed time used (i.e. terminal connect time);
- number of successful retrievals by type of access;
- number of unsuccessful retrievals by type of access;

- number of authority file error reports issued;
- number of authority file screens accessed;
- number of messages from the terminals;
- number of messages to the terminals;
- number of disk access requests:
  - read;
  - write.
- number of catalogue cards produced;
- number of machine-readable records output:
  - on-line;
  - off-line.
  - number of validation errors detected by error class.

The second section will provide the same information but for the total system. This will give users the opportunity to compare their own usage of the system with the usage by the total user population and thus provide a guide for the purpose of operational tuning.

4.12 In addition to user statistical information there will be produced a number of outputs for the purposes of central site control. These control outputs are:

- system log of all system activity;
- authority file maintenance log;
- message log.

5.0 SYSTEM MANAGEMENT

5.1 System controls will encompass the following area:

- system access;
- editing and validation of original input data;
- monitoring and reporting on authority file usage;
- production of usage statistics.

5.2 System access.

5.2.1 Users will have access to the system via authorised identification procedures.

5.3 Edit and validation.

5.3.1 Machine edit and validation checks will be performed on all original input records.

5.4 Authority file monitoring and reporting.

5.4.1 The creation, use and maintenace of authority files will be monitored by an Authority File Control Group. This group will have the responsibility, with assistance from users, for the integrity of the information contained on the authority files. A mechanism for the submission of error reports to the Authority File Control Group by users will be provided in the system. The authority to change entries on the authority files will be vested solely in the Authority File Control Group. The entry of data to the authority file will be performed by users in the case of original cataloguing, providing no appropriate item already exists on the files. Users will not be permitted to change authority files directly or alter national agency authority file data where this represents first use of the record. Users must instead use the error reporting facilities provided. This does not preclude them from amending their own copy of the record prior to making an output request. All error reports will be acknowledged showing what action was taken in response to the report.

5.5 Usage statistics.

5.5.1 As a means of managing the system there will be required at least the following weekly statistics:

- message traffic by user through the telecommunication network;

- number of catalogue cards produced for each user and the number of line printer lines produced;

- the number of machine-readable records output by each user;

- the number of frames of COM output produced for each users;

- the number of lines of printed output, exclusive of catalogue card production, produced for each user;

- the number of records amended by each users;

- the number of records archived by each user;

- the number of original entry records from each user;

- the number of successful and unsuccessful retrieval requests for each user classified by:

  - ISBN search;

  - author/title search;

  - author search;

  - title keyword.

- systems use in terms of elapsed time;

- the number of input/output requests made;

- total number of records added to the data base in the period;

- the present size of the data base in terms of records;

- the number of locations added ;

- the number of validation errors detected by class of error.

- total number of authority file entries held;

- number of error reports received;

- number of error reports causing amendment.

5.5.2 In addition to these statistics, a print of all messages other than bibliographic messages, i.e. general information or query messages sent through the general message screen facility, will be held in hardcopy form for reference purposes. This message log will provide hardcopy data relating to the notification of system problems by users and will be used by the system maintenance group in applying corrections to the system.

5.5.3 A weekly report for each insitutional user will be produced and forwarded to the user site for statistical purposes. These reports will be produced on standard computer output stationery using a line printer (Refer Section 4.12).

6.0 TRAINING AND CONSULTATIVE SERVICES

6.1 TRAINING.

6.1.1 The smooth functioning of the system requires that system users receive suitable training not only in the specific operation of the terminal equipment but also in broad terms on the overall workings of the system. Training courses will be provided for this purpose.

6.2 PROBLEM RESOLUTION

6.2.1 Inevitably in such a complex system, operational problems both major and minor will arise. Formal arrangements will be made to assist users in overcoming these problems.

6.3 DOCUMENTATION

6.3.1 All users of the system will be issued with comprehensive documentation covering terminal usage, system usage and bibliographic practices.

6.4 OTHER AIDS

6.4.1 It is planned to provide users with other aids. These are:

- in on-line mode display upon request system information pertaining to hours of operation, extensions to facilities and other items of general interest;

- a periodic newsletter similar to that issued by OCLC giving such information as changes in system policy, projected system operational changes and statistical information of general interest to users.

7.0 COMPUTING SYSTEM

7.1 System Considerations

7.1.1 In order to maximise the benefits stemming from a national bibliographic support system any computing infrastructure derived must provide for processing needs at all levels.

7.1.2 The computer system must be capable of providing fast and efficient access to a large data base by a large number of users dispersed over a wide geographic area. The data base at commencement of operation is expected to contain approximately 1.4 million records of 500 characters each. Growth of the base will be at the rate of approximately 300,000 records per annum. These records will originate from national agency sources and from data originally entered by users of the system. A large percentage of the national agency records may never be used but it is important that all records be available to users for copy cataloguing purposes as it is not possible to predetermine what records will be used by which user. In order to maximise the benefits of the system it is desirable that the full data base be directly accessible to all participants. This is particularly relevant in relation to locally entered records.

7.1.3 Also associated with the data base are a series of national authority files which will provide assistance to participants in their utilisation of the system. These files are dynamic and may be updated at any time in response to user entered data. It is desirable that the most up to date version of the authority files be available to all users at all times.

7.1.4 Location data will also be held as part of the data base. This data should be immediately available.

7.1.5 The data base including indexes and work areas is expected to utilise between 2,000 and 2,500 megabytes of disk storage within the first four to five years of system operation.

7.2 System Proposal - General Treatment

7.2.1 In order to meet the demands of accessibility and immediacy of data delivery it is recommended that the computer system be in the form of an on-line network covering the whole of Australia.

7.2.2 Consideration has been given to the best method of implementing this basic proposition. There are

several broad alternatives. These are:

- centralised data base with centralised processing;
- centralised data base with distributed processing;
- distributed data base with distributed processing.

7.3 Investigation of Alternate Strategies

7.3.1 The purpose and characteristics of the BIBDATA data base will have a large bearing on the choice of the most appropriate network configuration for the system. The system must be capable of accepting both bulk loaded data and user entered data and must be capable of making that data available, on demand, to any network user. In the context of the third alternative discussed above, the use of a totally distributed data base would involve large scale replication of information at a number of regional sites which would require a large amount of direct access storage space. The configurations to support such regional data bases would require sophisticated management software to control the data base and maintain the integrity of data in the network. The control functions within this software would require significant telecommunications resources if it were to operate satisfactorily.

7.3.2 An alternative approach in the same vein may be to hold a distributed data base in the form of regional data bases where the regional base holds only records actually used within the region. This approach also suffers from the problem of data base control and would require at least some form of central data base from which to draw first-use records. The sharing of originally entered data in both of the above types of system would require either the holding of multiple records for the same item or the provision of software to access and search each regional data base in the network prior to initiating original entry cataloguing.

7.3.3 By adopting a centralised data base approach most of the difficulties of controlling data and sharing data within the system will be overcome as all data will be held in one location and will be subject to the control of one software system at one site. It is therefore considered that a centralised data base approach is the most appropriate for this type of system.

7.3.4 Whilst a centralised data base approach is suggested it is possible to undertake some processing of the actual data at distributed sites. Such processing might include edit and validation of user entered data, the preparation of output products and the provision of possible system enhancements such as an acquisitions sub-system. While the use of distributed processing in this manner would result in significant cost savings, it would be less cost effective than a totally centralised approach for at least the first three to four years. This is due to the operational costs of distributed sites, particularly in the area of staff costs, and the economies of scale which could be applicable in the short term by the use of a centralised processing system. The system must however recognise the possible need to link existing user installations to the network. A possible difficulty with the attachment of user regional sites is that software packages to process BIBDATA records may not be available for all machine types which users may wish to attach. This would mean further developmental work for user sites and the creation of multiple versions of the same basic software. Regardless of whether regional processing sites are attached or not the central site will have to acquire or develop software to service the needs of users who do not have access to regional sites should they exist. The logistics of implementing a centralised processing system are less complex than those associated with the development of a distributed network. This means that the implementation time-scale is more favourable for a centralised processing system.

7.3.5 It is recommended that centralised processing should be adopted but with provision in the network design for the attachment of user owned and operated mainframes. Provision should also be made for future introduction of distributed processing sites as the user population increases to the level which makes these types of sites more cost effective than enhancement of the central site operation.

7.3.6 Factors which were taken into account in framing the recommendation are:

- establishment costs;

- operating costs;

- speed of implementation;

- the comparative ease of making originally entered cataloguing data available to all participants;

- the problems, not yet satisfactorily solved, of providing backup and control facilities for a distributed data base;

- economies of scale can be achieved, in the short term, from a centralised operation;

- standard software packages can be developed centrally to provide basic data manipulation capability with regional resources being used to develop user specific software rather than duplicate software development effort at a number of regional sites: this should lead to a faster implementation of the full system capability and better utilisation of existing manpower resources.

7.3.7 It is recognised that the central site will of necessity provide a standard level of service and in consequence users will have individual needs which cannot be economically met by a centralised operation. Therefore it is envisaged that in the longer term distributed processing utilising a centralised data base will be required. This phase of the implementation will facilitate the development of integrated library processing systems on a regional or individual basis with the central site providing basic data in the form of bibliographic records and authority file information and the user site providing original entry records and location data back to the central site. User sites will then be in a position to cater for all the functions they require such as acquisition, accounting and circulation control based on one data base record. The national centre could assist users by fulfilling a co-ordinating role in this area.

7.4 System Implementation

7.4.1 In order to implement the above proposal the network will be called upon to support two classes of users. These are:

- users with computer facilities;

- users with terminals only.

7.4.2 It is recommended that the network be implemented in a staged manner. This is to provide at all stages of development a firm base upon which to extend the system capabilities. The approach is particularly necessary in view of the anticipated scarcity of manpower resources. By following this approach the system can be progressively tuned to maximise performance as well as providing feedback as to the correctness or otherwise

of planning estimates as they relate to system loads.

7.5 Telecommunications Considerations

7.5.1 The proposed network will consist of a number of high speed lines servicing node points situated in major user population areas. There appears to be two acceptable methods of implementing the node points in the telecommunications network. These are:

- by use of multiplexors;

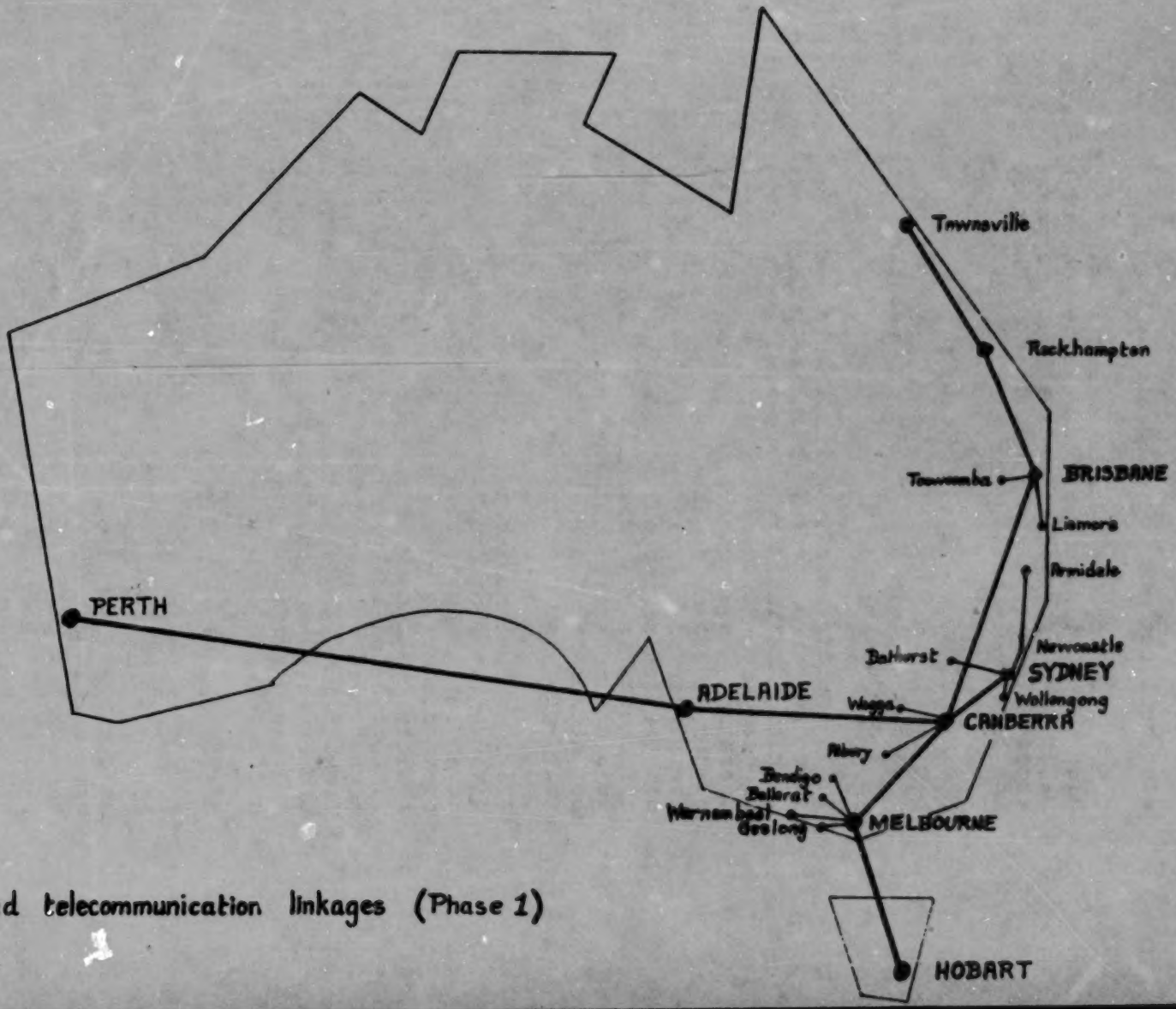
- by use of stored program concentrating computers.

7.5.2 Multiplexors. Multiplexors have the advantage that they are simple, relatively inexpensive devices with high reliability They are also transparent to the programmer. However because of their method of operation, viz: dividing a high speed line into a number of channels, there is a physical restriction on the number of channels which can be allocated to a line of particular speed. There is also some loss of efficiency in the division process. As a result there is a definite limit to the number of devices which can be attached to any one high speed line even with multi-dropping on a channel.

7.5.3 Concentrators. Concentrators have the disadvantage of being more expensive and software dependent. They do have the advantage of being able to more effectively use the high speed links and the ability to attach more lines in the local network without necessarily having to increase the number of high speed links. These devices provide greater flexibility as well as a growth path to regional processing when this becomes cost effective. They do require operations staff but can be configured to keep staff requirements to a minimum.

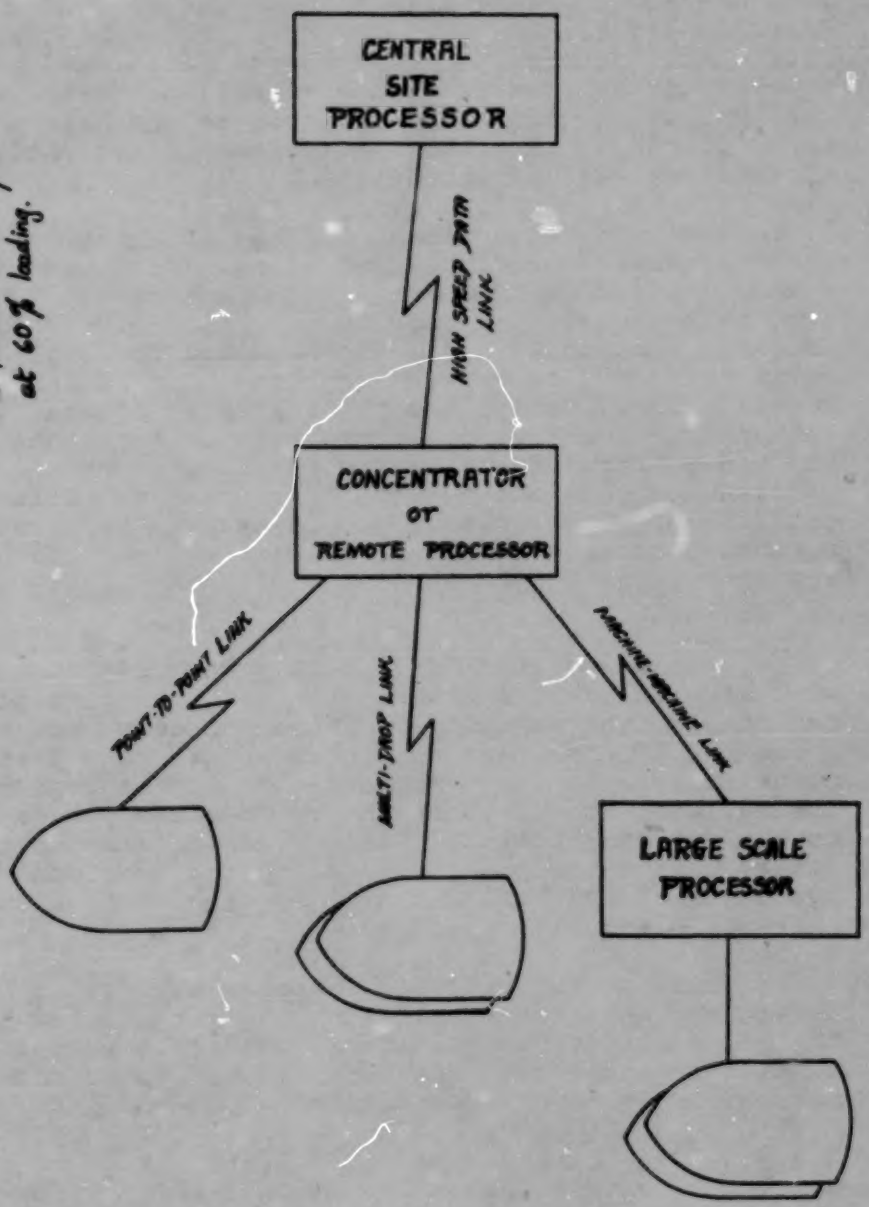
7.5.4 The number of staff required to service a concentrator is much less than would be required to service a full regional processing centre. This fact coupled with the increased flexibility of a concentrator and the growth path it provides makes the use of concentrators attractive. Consequently it is recommended that concentrators be used at network node points. This recommendation will be subject to review at a time closer to system implementation. For the purposes of costing the system it is proposed that concentrators be sited in all capital cities. The basic cost of these units has been estimated at $30,000 each.

7.5.5 Data Line Types. It is proposed that one or more



34 Proposed telecommunication linkages (Phase 1)

35


CENTRAL SITE PROCESSOR
MAIN SPEED PATH LINK
CONCENTRATOR OT REMOTE PROCESSOR
POINT-TO-POINT LINK
MULTI-DROP LINK
PURCHASE-MACHINE LINK
LARGE SCALE PROCESSOR
Maximum transmission rate per high speed line is 2·4 million characters/hour at 60% loading.
Number of local lines supplied = 30 to 60

Schematic of concentrator linkage and support functions

9600 bits per second inter city trunk links will be attached to each concentrator. The trunk lines will be fed by local lines servicing individual institutions. These feeder lines will have a speed of 4800 bits per second. Units in the individual institutions will be multi-dropped where visual display terminals are connected to the network. In the case of a central processing unit connection to the system (i.e. a machine-machine link) this will be the only unit on the line. Consideration was given to the use of the Common User Data Network as a telecommunications vehicle. However advice from Telecom Australia marketing section was that it would not be appropriate to base any long term plans on the CUDN network. Consequently this alternative was discarded.

7.5.6 The estimated line loadings and the number of lines required for high speed links are given in Table 1 and Table 2 of Appendix F. The estimated number of terminals required to service the projected throughput is given in Table 3 of Appendix F. The figures are derived from estimates supplied in response to questionnaires completed by a sample of the library community. In arriving at the estimates of the number of lines required a maximum figure of 60% line utilisation has been used. This is to offset the problem of peak loading of links. It has also been assumed that the number of libraries serviced by the system will reach 100 by 1981-1982.

7.5.7 Communications Protocols. The BIBDATA system will service users across a wide range of machine types and models. The majority of these machines will utilise a communications protocol peculiar to the particular manufacturer. If these machines are to be connected to the national system there should desirably be a common communications protocol for all telecommunications links. One of the problems facing the development of a system such as BIBDATA will be the selection of a suitable protocol.

7.5.8 Users of the proposed system will include Federal Government Departments. In the longer term, say in five to ten years, there could be significant benefit in linking the telecommunications system to selected data bases in Government Departments.

7.5.9 The Public Service Board is developing communications standards to be followed by Government Departments. Consequently these guidelines should be followed by all Departments in developing new systems. If the BIBDATA system is to use a common standard then it is recommended that the Public Service guidelines be

those which are adopted. By following this approach the system can capitalise on the work done by the Public Service Board and provide the link by which future access to Government data bases can be achieved.

7.6 Central Hardware Considerations

7.6.1 Having described the proposed network strategy, consideration is now given to the central site hardware required to service the network. The general projection of likely central hardware requirements has been made using IBM equipment in the model. This has been done purely for the purposes of developing the model as fully as possible and should in no way be construed as an indication of a preference for a particular line of equipment. The projection is based on the need to service 100 participants by the end of 1988 and recognises that the system should be capable of being upgraded to meet user needs up to 1989. It should be pointed out that the current trend in much of hardware development is to multi- processor machines and it may be found that in a system growth situation such as the one pertaining to BIBDATA the utilisation of add-on multi-processor equipment may prove to be the more cost-beneficial approach. Any statement of mainframe equipment requirements at this stage is purely illustrative.

7.6.2 Figure 1 is a schematic of a possible configuration suitable for running an on-line shared cataloguing system as envisaged in this report.

7.6.3 In order to cater for peaking both short term and long term it is felt that utilisation of the CPU should be maintained at 60-70%. Any higher level of utilisation could result in lengthy queues, slower response time and degradation of the service in heavy peaking situations. The average system response time sought is three seconds. Maximum acceptable system response time is considered to be ten seconds.

7.6.4 Mass storage requirements are as indicated in Appendix E and the physical unit requirements have been assessed from these estimates.

7.6.5 The number and type of magnetic tape units indicated are those deemed necessary for the efficent operation of the BIBDATA system and those required to facilitate tape exchange with other organisations and participant institutions.

7.6.6 Line printer requirements have been derived from estimates made in Appendix D of expected output volumes.

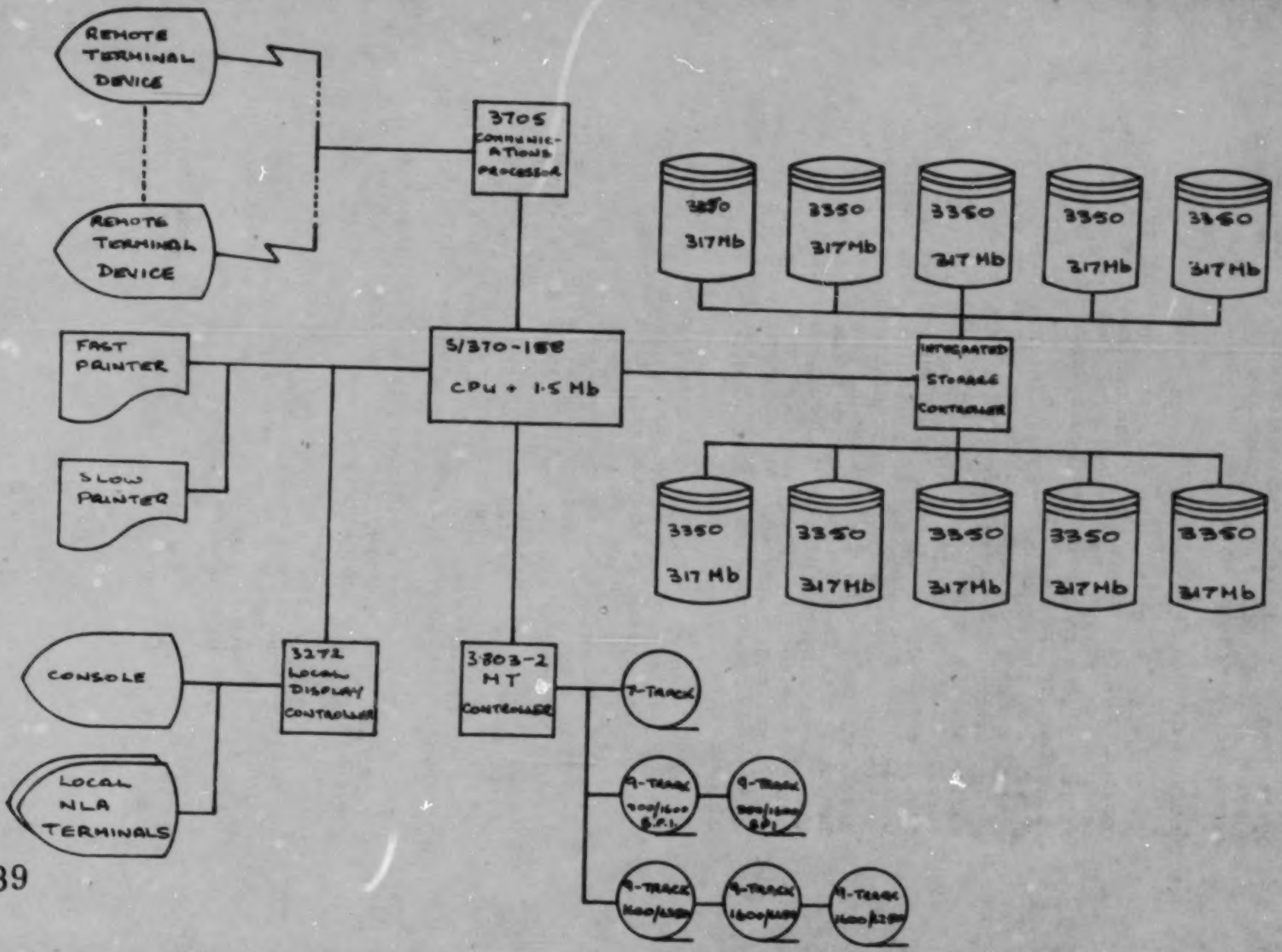

REMOTE TERMINAL DEVICE
REMOTE TERMINAL DEVICE
3705 COMMUNICATIONS PROCESSOR
3350 317Mb
3350 317Mb
3350 317Mb
3350 317Mb
3350 317Mb
FAST PRINTER
SLOW PRINTER
S/370-158 CPU + 1.5 Mb
INTEGRATED STORAGE CONTROLLER
3350 317Mb
3350 317Mb
3350 317Mb
3350 317Mb
3350 317Mb
CONSOLE
LOCAL NLA TERMINALS
3272 LOCAL DISPLAY CONTROLLER
3803-2 MT CONTROLLER
7-TRACK
9-TRACK
9-TRACK
9-TRACK
9-TRACK
9-TRACK

FIGURE 1

7.7 Central Site Operational Considerations

7.7.1 The Central site will need to operate on a two shift basis. The prime shift will be devoted to on-line service as its first priority with the second shift performing batch processing of the days on-line output requests. Output requests made during prime shift will be queued for later processing. There are two main outputs, these are catalogue cards and magnetic tape records. Production of catalogue cards would be performed daily but it is proposed that magnetic tape output, because of the potentially low daily volume for any one institution, would be produced on a weekly cycle. For example, if there were 30 magnetic tape users then six tapes would be written each night. These tapes would contain the last full weeks data for the particular user. However some users may wish to receive data more frequently. This could be arranged with the operations group.

7.7.2 Daily on-line operation will need to cater for the time differential between Eastern Australia and Western Australia as well as variations due to the introduction of Summer Time in some States. Consequently hours of on-line operation would need to be from 8.30AM Eastern Standard Time to 8.30 PM Eastern Standard Time each day. The question of varying public holidays will also need to be addressed.

7.7.3 Day to day user interaction with the system at the human level will be provided for in the system administrative structure. This interaction will be in relation to operational problems rather than policy issues which would be addressed to the BIBDATA Network Management Committee.

7.7.4 Data integrity within the system will be maintained by the central site so far as it affects centrally held data. Regular backup of files will be performed and any package chosen to provide the BIBDATA service will have to contain adequate provision for protection against loss of data due to system failure.

7.7.5 Whilst the initial system will permit access by any user to any item of data in the bibliographic file, there wil be a requirement for the software package to provide protection for designated items of data. If this is not specifically available then it must be capable of being incorporated.

7.7.6 Levels of authorisation are proposed for the system. These levels will vary from user to user. They

will apply to such actions as amending authority files, amending master copies of bibliographic records, deleting records etc.

8.0 NETWORK ADMINISTRATION AND MANAGEMENT

8.1 Networks of the type proposed for the BIBDATA system are new to Australia. Similiar systems exist in other countries and as a result management structures have been developed to operate these types of networks. However overseas networks operate in an economic and political climate which is different to that which prevails in Australia. These economic and political factors have an effect on the way a management structure of this type develops and operates. Consequently in developing an organisational structure suitable for Australian conditions overseas experience should be considered but recognition must be given to the particular legislative, jurisdictional and funding problems which confront an organisation of this type in Australia.

8.2 It is considered desirable that an interim Network Liaison Committee be established as soon as possible to provide advice and guidance during the development of the BIBDATA system.

9.0 IMPLEMENTATION PLAN

9.1 Steps to Implementation

9.1.1 The preparation of this document is the first step in a number culminating in system implementation. The remaining steps are:

- development of a detailed software specification based on the discussion of this document;

- evaluation of existing software packages which may meet the requirements of the proposed system;

- obtain approvals in principle prior to proceeding to preparation of hardware tender specifications;

- prepare and issue tender specifications;

- evaluate tenders and select equipment;

- complete necessary development work;

- complete site preparation and equipment installation;

- commence implementation.

9.1.2 An overall schedule for the implementation of the BIBDATA system is given in macro form overleaf. This schedule gives two options. The first, in unbroken lines, sets out the planned phases subject to resource availability whilst the broken lines indicate a pessimistic view of the same phases.

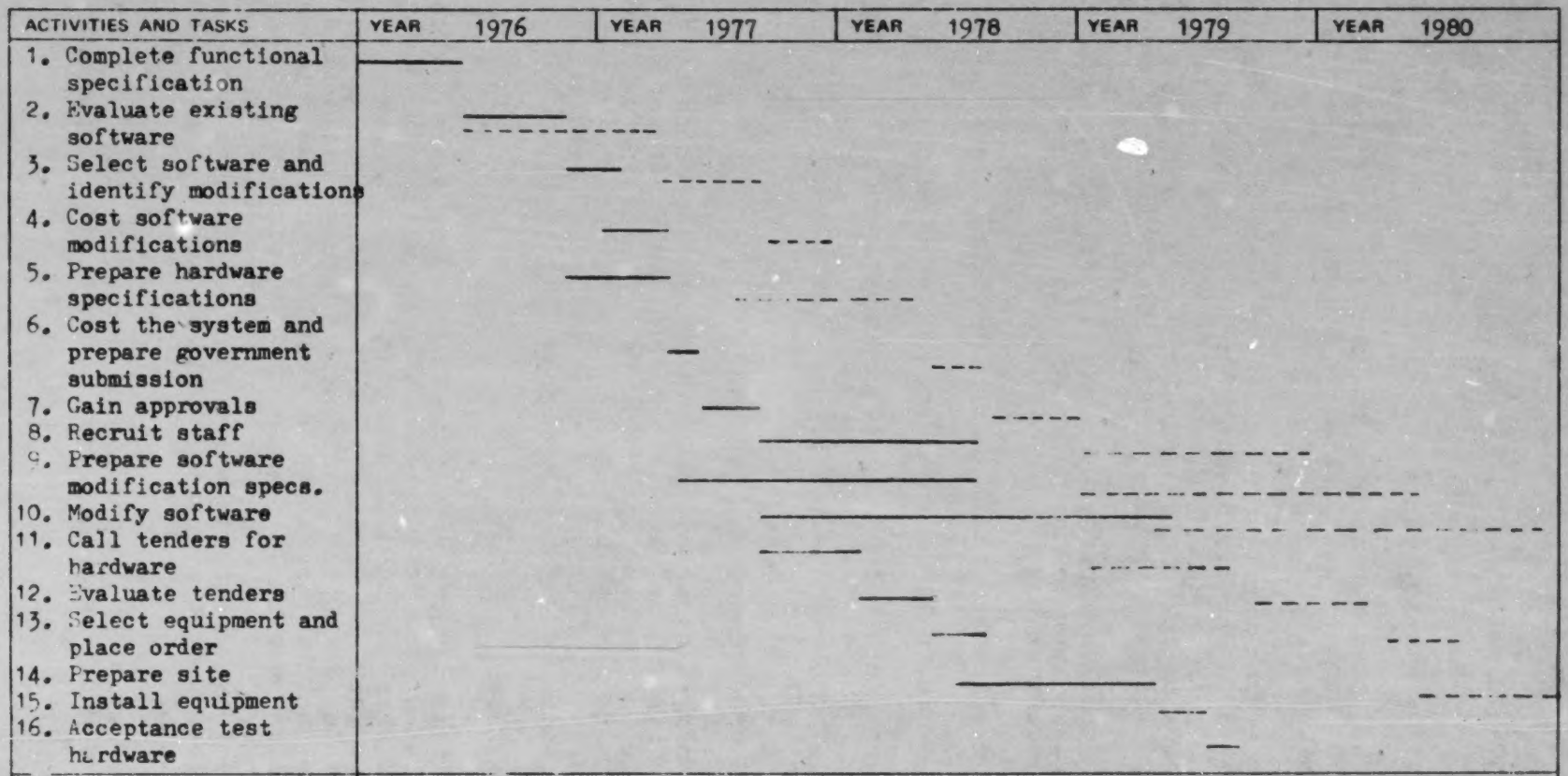
9.2 Software Selection

9.2.1 It is desirable that an existing software package be located to perform all the required functions. However this may be difficult as some of the functions required are not yet available on systems as long established as OCLC. It is more likely that a basic package can be located which can be modified to meet Australian needs. This phase of the plan requires an evaluation of existing software against the requirements of the functional specification together with other criteria such as cost and efficiency (Refer Appendix K).

9.2.2 Possible bibliographic packages of the type required which have been identified to-date include:-

NATIONAL LIBRARY OF AUSTRALIA – SYSTEMS DEVELOPMENT SECTION

PLANNING FORM 1



STAFF LOADINGS					
Systems librarians	-	2	2	3	3
Computer systems officers	3	5	9	15	15
Project officers	1	1	2	2	2
Clerical	-	1	2	2	8
Computer operators	-	-	-	2	12

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(38)

ACTIVITIES AND TASKS	YEAR 1976	YEAR 1977	YEAR 1978	YEAR 1979	YEAR 1980
17. Arrange telecom. links			———	———	
18. Prepare user documentation			———	———	
19. User training				—	
20. System testing				—	
21. Commence operation					--- ———
STAFF LOADINGS					
Systems librarians	–	2	2	3	3
Computer systems officers	3	5	9	15	15
Project officers	1	1	2	2	2
Clerical	–	1	2	2	8
Computer operators	–	–	–	2	12

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- ORBIT;
- BALLOTS/SPIRES;
- DOBIS;
- MERLIN;
- Washington Library Network;
- LIBRIS;
- ISIS;
- IMDOC;
- BIBNET;
- DIALOG;
- ELLHILL.

Identification of other suitable packages is being undertaken.

9.2.3 Having identified a suitable basic package and the areas in which modification is required, a broad cost for the software plus modifications will be calculated. This broad cost will form a part of an approach to Government seeking approval to proceed with the system and seeking authority to prepare hardware tender documents.

9.2.4 If a software package is identified then this will, to a greater or lesser extent, pre-empt the hardware selection depending upon a number of factors such as programming language, telecommunications software etc.

9.3 Tender Authorisation

9.3.1 Having selected a software package and received the necessary authorities to proceed then a hardware tender specification will be prepared. This will be based on the needs of the software and the throughput volumes projected for the computer system as a whole. This document together with estimated costs will then be submitted to the appropriate Government authority seeking permission to issue the tender.

9.3.2 Brief discussions have already been held with the Public Service Board in relation to terminals and telecommunications needs. Approaches have also been made to the major hardware suppliers outlining the

broad concept and seeking information on equipment which they consider suitable for the BIBDATA project.

9.3.3 It is planned to call tenders for equipment supply. Subject to software choice these tenders may be limited.

9.4 Software Modification

9.4.1 There will be a need to invest resources in developing any acquired software pacakage to the point where it meets Australian requirements. The amount of effort required to achieve this aim will vary according to the basic package. A preliminary estimate for planning purposes has been set at between 10 and 20 man-years of effort.

9.4.2 The developmental work required on even an operational package is substantial. The DOBIS package to be acquired by Canada will require, according to Canadian estimates, 10.5 man-years of modification effort before it meets their needs. The British Library will employ a team of 22 programmers plus outside contract resources to develop the MERLIN package.

9.5 Implementation Phasing

9.5.1 Implementation of the system will be phased. Phasing will apply to both the services to be offered and the rate of introduction of users. This phased approach will result in the provision of an initial basic but reliable service which can be offered at minimum cost but with the capacity to increase the range of services in an orderly fashion. Phasing would be implemented in the following order:

	PHASE 1	PHASE 2
PRODUCTS		
Terminal Output - All types	X	
Magnetic Media Output:		
Cassette at terminal	X	
Individual records at Central Site	X	
Individual Authority Catalogue Card records	X	
File records		X
Hardcopy Output:		
Catalogue Cards	X	
COM catalogues and supplements	X	
Call numbers on		

catalogue cards	X	
Accession lists	X	
Authority File on catalogue cards	X	
Spine labels, book pockets etc.		X
Location listings on microform	X	
DATA BASE ACCESS		
ISBN	X	
BNB number	X	
LC Card number	X	
Other control numbers	X	
Author/title truncated search key	X	
Author		X
Title keyword		X
Classification (LC and DC)		X
Subject		X
Series		X
AUTHORITY FILES		
Name	X	
Series	X	
Subject	X	

9.5.2 The initial basic system will provide the following services:

- on-line real time multi-library access to a central data base of bibliographic records of monographs in Roman script;

- editing facilities to amend retrieved records to conform to user requirements;

- facilities to perform original cataloguing using system supported aids such as national authority files and call number files;

- production of output products such as catalogue cards, MARC records and Computer Output Microform;

- archival facilities for user amended data;

- supply of location information, in real time, for specific monographs.

Statistical data relating to cataloguing throughput will also be provided in the basic system.

9.5.3 During later implementation phases, software extensions will be made to provide a message switching capability for inter-library loan purposes. Future extensions will also cater for the processing of serials, non-Roman script materials and certain non-book materials.

9.6 Staff Requirements

9.6.1 The level of staff required to develop and implement this system will be significant. Manpower estimates expressed in man years for each major step in the process are:-

	MAN YEARS
1976/77	
Review available software and prepare recommendations	1.0
Prepare software modification specifications and cost programming work	3.5
Develop hardware tender specifications	1.5
Obtain necessary approvals	0.3
1977/78	
Call tenders, evaluate responses and select equipment, arrange telecommunications	5.0
Recruit and train additional development staff	1.5
Commence developmental programming	6.0
1978/79	
Continue developmental programming	12.0
Prepare site and install equipment	3.0
Acceptance test equipment	1.0
1979/80	
Mount and test the system as a whole	3.0
Initiate the operational system	0.5
Commence operation	-
Ongoing maintenance and development task	10.0

The number of systems librarians, programming staff and clerical staff required to perform these tasks based on

70% availibility is:-

		No. of Staff
1976/77	6.3 man years	9
1977/78	12.5 man years	18
1978/79	16.0 man years	23
1979/80	13.5 man years	19

In addition to these staff there will be required a group of computer operators. It is estimated that 12 operators will be required for a two shift operation.

9.6.2 It is difficult to state with confidence that the required additional staff for 1976/77 will be available. Presently 4 persons are employed full time on the BIBDATA project. Should the required additional staff not be available, possible alternative strategies are:-

- continue with the present staff level for 1976/77 and accept the resultant lengthening of the implementation time-scale

- employ contract staff to undertake the additional workload;

- utilise the resources of BIBDATA participants should they be willing and able to provide them on a voluntary basis;

9.7 Rate of Introduction of Users

9.7.1 Planning estimates for the introduction of users to the system are as follows: n

PERIOD ENDING	No. OF USERS INTRODUCED	TOTAL USERS ON SYSTEM
Dec 1979	3	3
Mar 1980	6	9
Jun 1980	10	19
Sep 1980	17	36
Dec 1980	16	52
Jun 1981	22	74

9.7.2 In the first six months of operation the system will serve a limited number of libraries in Sydney, Melbourne, Brisbane and Canberra. During this period software problems will be identified and corrected, particularly telecommunications software problems, and estimated system loads compared with actual loads at that stage of development. The service will be progressively extended to cover Tasmania, South

Australia and Western Australia by mid 1981. This timetable has been derived after consideration of the requirements of telecommunications connections, user training and general support levels needed to satisfactorily operate the system. The need to maximise cost/benefit returns as early as possible in the life of the system was also considered.

9.7.3 It is anticipated that the connection of users will require twelve months notice in order to arrange the provision of telecommunications links and to procure terminal equipment.

10.0 COST/BENEFIT

10.1 Staff Costs Using Present Cataloguing Methods

10.1.1 The sources of data for cataloguing purposes are diverse in the present operational situation as are the media from which that copy is taken. Equally wide variations are evident in the degree to which libraries use copy cataloguing techniques.

10.1.2 The BIBDATA questionnaire (Appendix H) indicated that the percentage of copy cataloguing undertaken by libraries varied from zero to 100% with the majority being in the range of 60-90%. The weighted average based on titles catalogued was approximately 76%. A number of libraries were performing the copy cataloguing function on less than 45% of their intake whilst comparable libraries of the same type were using up to 80% copy cataloguing.

10.1.3 The costs associated with cataloguing operations were also wide ranging. Based on a sample of 35 of the larger volume institutions the average cost of cataloguing was found to be $5.35 per title which is the average cost of cataloguing 570,688 items at a cost of $3,047,709 exclusive of overheads. The range of costs quoted by respondents to the survey was from 50 cents to sixteen dollars per cataloguing operation. Using current methods to catalogue the proposed BIBDATA volumes then the costs would be as shown in Table 1.

TABLE 1

ESTIMATED STAFF COST OF CATALOGUING
PROJECTED BIBDATA VOLUMES
USING CURRENT METHODS
$'s

	1979	1980	1981	1982	1983
Estimated cost	401,250	4,280,000	4,815,000	5,457,000	5,885,000

10.1.4 The figures given in Table 1 do not take into account increases in salary costs and are expressed at 1975 cost levels. They do not include administrative overheads.

10.2 Projected Staff Costs using Proposed Cataloguing Method

10.2.1 Calculations relating to the proposed system are also based on 1975 cost levels. The major difference between the two methods is a reduction in non-professional time and an increase in the facility to undertake copy cataloguing. The intellectual content of original cataloguing will not be reduced by the system but the speed of handling data is increased by the machine assistance in handling a record.

10.2.2 An estimate of the cataloguing costs per item for the BIBDATA system, exclusive of hardware, operational costs and depreciation, has been derived by using estimated NLA cataloguing costs as a model. The 1975 NLA cataloguing costs per monograph item (including filing) were $4.64 for copy cataloguing using LC cards and $8.67 for original cataloguing (Details Appendix G). The BIBDATA estimated costs are:

Original cataloguing	$6.17
Copy Cataloguing	$1.91

The method of calculating these costs is given in Table 2. These figures do not include administrative overhead.

TABLE 2

ESTIMATED UNIT CATALOGUING COSTS
USING PROPOSED BIBDATA SYSTEM

	Time (mins)	Staff Grade	Salary (Annual)	Cost
COPY CATALOGUING				
Data base search	3.0	CA5	7679	0.24
Editing	10.0	CA5	7679	0.80
Shelflisting	3.0	CA5	7679	0.24
Filing	10.0	CA1,3	6090	0.63
TOTAL				1.91
ORIGINAL CATALOGUING				
Data base search	3.0	CA5	7679	0.24
Cataloguing	48.0	L1	10100	4.99
Shelflisting	3.0	L1	10100	0.31
Filing	10.0	CA1,3	6090	0.63
TOTAL				6.17

10.2.3 Applying these estimated costs to the projected BIBDATA cataloguing volume for the five years 1979 - 1983 inclusive gives the costs shown in Table 3 exclusive of overheads. The volume figures for original and copy cataloguing operations are derived from Appendix B.

TABLE 3

ESTIMATED STAFF COSTS OF CATALOGUING
PROJECTED BIBDATA VOLUMES USING
PROPOSED SYSTEM

	1979	1980	1981	1982	1983
ORIGINAL	92,550	740,400	777,420	752,740	678,700
COPY	114,600	1,298,800	1,478,340	1,715,180	1,890,900
TOTAL	207,150	2,039,200	2,255,760	2,467,920	2,569,600
AV COST/UNIT	$2.76	$2.55	$2.51	$2.42	$2.34

10.3 Projected Savings in User Staff Costs

10.3.1 Thus the proposed system will result in savings in staff costs at the libraries of $2.83 on average per unit catalogued. The projected annual savings on staff costs is given in Table 4.

TABLE 4

ESTIMATED STAFF COST SAVINGS FOR CATALOGUING
PROJECTED BIBDATA VOLUME USING
PROPOSED SYSTEM

1979	1980	1981	1982	1983
194,100	2,240,800	2,559,240	2,989,080	3,315,400

These savings are exclusive of overheads.

10.4 Hardware and Associated Costs

10.4.1 A component cost of the proposed system is the cost of acquiring and operating a central hardware facility. The machine required to service the system will need to be powerful with a large direct access

capability and fast disk access. It will require a sophisticated telecommunications subsystem and a number of high speed printers and magnetic tapes.

10.4.2 Both the hardware and software will have to have been proven in large scale operation and there must be adequate support for the facility in the form of manufacturer backup and maintenance. The terminals selected must also be adequately supported throughout Australia and be capable of handling the full library character set as defined in this document.

10.4.3 Acquisition of the hardware can be by purchase or by lease/rent. The choice of which is most appropriate has yet to be made.

10.4.4 For the purpose of cost estimates for this document the purchase price for a representative range of machines has been taken. These estimates are given in Table 5.

10.5 Software

10.5.1 Software development costs will need to be amortised. These costs are estimated on the basis of a basic package being available for modification. The base price of the package has been estimated at $100,000 for acquisition, initial training and documentation. To this figure must be added modification costs which have been estimated at 15 man years at a cost of $24,000 per man year for a fully supported staff member. This represents $360,000 in modifications. Thus the total software cost prior to operational running has been estimated at $460,000. This amount has been amortised over 5 years at $92,000 per annum.

10.6 Central Site Staff Costs

10.6.1 Associated with the operational aspects of the system will be central site maintenance and operations staff. Central site staff will support and operate both internal processing systems and the BIBDATA system. The total estimated staff costs and the proportion applicable to BIBDATA are listed in Table 6.

10.7 Consumables

10.7.1 Other costs associated with the system operation are given in Table 7. These costs represent annual consumable costs and telecommunications rental costs.

MADDN 5

ESTIMATED HARDWARE AND SITE COSTS FOR PROPOSED BIBDATA SYSTEM

Central Processor	
Main storage 1.5 megabytes	2,500,000
Direct Access Storage	
3000 megabytes online	400,000
Magnetic Tapes	
5 X 9-track	150,000
1 X 7-track	15,000
Unit Record Devices	
2 X printers	150,000
Telecommunications	
Front end processor	120,000
Concentrators	180,000
Terminals	
140 X visual display units	700,000
15 X hardcopy terminals	60,000
Site Preparation	
Central site	500,000
Concentrator sites	50,000
Terminal sites	20,000
TOTAL	4,845,000

This capital amount has been depreciated at 10% per annum fixed.

(51)

TABLE 6

ESTIMATED DIRECT STAFF COSTS TO PROVIDE AN OPERATIONAL BIBDATA SERVICE

	BIBDATA PROPORTION	DIRECT SALARY COST $'s	BIBDATA PORTION $'s
Administrative	25%	59650	14912
Daily Operations	40%	427975	171190
Bibliographic Control	90%	139601	125640
Development	50%	152316	76158
TOTAL BASIC SALARY COST PER ANNUM		779,542	387,900

These costs are exclusive of overhead and require 100% loading for costing purposes.

TABLE 7

ESTIMATED BIBDATA CONSUMABLE COSTS

	1979	1980	1981	1982	1983
Communications	2,500	120,000	300,000	500,000	500,000
Paper, Card Stock	8,000	31,000	36,000	41,000	45,000
Magnetic media	13,000	6,500	6,500	6,500	6,500
Cleaning	2,500	10,000	10,000	10,000	10,000
Other	15,000	15,000	25,000	25,000	25,000
COM	-	5,000	10,000	10,000	15,000
Power	10,000	20,000	20,000	20,000	20,000
TOTAL	51,000	207,000	407,500	612,500	621,500

10.7.2 The use of card stock is expected to decline from about 1980 onwards as indicated by answers in the BIBDATA questionnaire. Consequently cost for this item will tend to decline on a per institution basis but rise slightly due to the increased number of institutions.

10.7.3 Telecommunications line costs are based on limited connection in 1979 expanding to cover Eastern Australia in 1980 and totally covering Australia from 1981 onwards.

10.8 Annual Operating Costs

10.8.1 The estimated annual operating costs associated with the proposed system are summarised in Table 8.

10.9 Benefits

10.9.1 The major benefits associated with the BIBDATA sytem are seen as being:

- reduction in unit cost of cataloguing

- improved access to material for inter library loan purposes;

- improved access to records for general bibliographic searching and verification purposes;

- provision of a vehicle for the development of national bibliographic standards;

TABLE 8

ESTIMATED ANNUAL COST TO OPERATE THE PROPOSED BIRDATA NETWORK

COST CENTRE	1979	1980	1981	1982	1983
Direct staff cost (participant) plus 100% overhead	414,300	4,078,400	4,511,520	4,935,840	5,139,200
Depreciation of Hardware and site costs (10%)	484,500	484,500	484,500	484,500	484,500
Amortisation of software	92,000	92,000	92,000	92,000	92,000
Central site staff plus 100% overheads	775,800	775,800	775,800	775,800	775,800
Consumables	51,000	207,500	407,500	612,500	621,500
Floor Space rental (30 metres x 50 metres $20 at $20 sq. metre	30,000	30,000	30,000	30,000	30,000
TOTAL ANNUAL COST	1,847,600	5,668,200	6,301,320	6,930,640	7,143,000

- permit development of co-operative acquisition policies leading to a greater value for each dollar spent on library services.

10.9.2 The proposed system will have a batch interface to support off-line operations similiar to that available under the Australian MARC Record Service and will replace that system in its present form.

10.10 Cost/Benefit

10.10.1 The cost benefit analysis of the proposed system is given in Table 9. It is based on a comparison of present cataloguing methods with the proposed method.

10.10.2 The savings available over a five year period to meet capital expenditure are $11,809,331. After deducting initial capital costs of $4,845,000 for hardware and site work and $460,000 for software the savings expressed at present values amount to $6,504,331 for the five year period.

TABLE 9

COST/BENEFIT ANALYSIS

	1979	1980	1981	1982	1983
PRESENT COSTS AT PROJECTED VOLUMES (Refer Appendix B)					
Direct staff cost at the library plus 100% overhead	802,500	8,560,000	9,630,000	10,914,000	11,770,000
AMRS Costs	20,000	22,000	24,000	26,000	28,000
TOTAL	822,500	8,582,000	9,654,000	10,940,000	11,798,000
PROJECTED COSTS AT PROJECTED VOLUMES (Refer Appendix B)					
Costs as per Table 8	1,847,600	5,668,200	6,301,320	6,930,640	7,143,000
Less Depreciation and Amortisation	576,500	576,500	576,500	576,500	576,500
OPERATING COSTS	1,271,100	5,091,700	5,724,820	6,354,140	6,566,500

continued over page

SAVINGS AVAILABLE TO MEET CAPITAL EXPEND.	-448,600	3,490,300	3,929,180	4,585,860	5,231,500
Expressed at present values at 10% rate of investment	-407,818	2,884,545	2,952,051	3,132,204	3,248,350

GROSS SAVINGS EXPRESSED AT PRESENT VALUE	$11,809,331
Less Capital Expenditure	5,305,000
NET SAVINGS	$ 6,504,331

(57)

11.0 CHARGING

11.1 Basis of Charges

11.1.1 It is the intention that some form of charge be made for any use of the system. Charges levied will be based on actual system resource usage and will not be a simple flat fee per system interaction. The charge can be made with the aim of recovering:

- full system costs including hardware and software amortisation, staff costs and consumable costs;

- system costs excluding amortisation of capital expenditure;

- consumable costs only.

11.1.2 There is the added alternative that recovery may be including or excluding overhead costs. This applies to staff costs which in cost benefit terms have a loading of 100% to cover overhead in the form of accommodation and facilities.

11.1.3 The charge estimates derived from the following calculations are on the basis that every system facility is used for each cataloguing operation. These are meant to be a guide to the possible charges and not actual projected charges. Calculation of actual charges cannot be undertaken until hardware and software selection has been completed.

11.2 Cost Centres

11.2.1 In terms of cost per unit processed the central site costs have been dissected into three categories. These are:

- consumable costs;

- staff and accommodation costs;

- amortisation and depreciation costs;

11.3 Consumable Costs

11.3.1 Consumable costs are based on the costs in Table 7 of Section 10. The consumable costs for each year based on the throughput for that year are:

TABLE 1

ESTIMATED CONSUMABLE COST PER UNIT PROCESSED
BASED ON PROJECTED CONSUMABLE COSTS AND VOLUMES

1979	1980	1981	1982	1983
0.68	0.26	0.46	0.60	0.57

11.3.2 The cost of consumables in the first three years of system operation fluctuate wildly due to the influence of telecommunications costs where lines are widespread and lightly loaded. As will be noted the communication costs are spread over all participants in this model. The cost used in further calculation is $0.56 recovery of variable costs for each unit processed given that the full range of facilities are used.

11.4 Staff and Accommodation Costs

11.3.1 These costs are based on floor space rental costs and a proportion of central site staff costs. These figures will obviously fall as volume increases until volume increases to such a level that it forces further expenditure. As a basis for calculation the throughput volume used is one million units catalogued per annum. Applying this volume against the fixed cost of $805,800 the resultant fixed cost per unit has been set at $0.80. This figure includes overhead cost recovery of 100% on direct staff cost. The unit cost for this component comprises:

Staff Cost	77.5 c/unit
Accommodation	3.0 c/unit
TOTAL	80.5 c/unit

11.5 Amortisation of Capital Expenditure

11.5.1 The capital costs, including hardware, software and site preparation, depreciated at 10% fixed will account for $576,500 which represents $0.57.65 per unit on a throughput of one million units per annum. This cost has been set at 57 cents per unit for calculation purposes.

11.6 Summary of Charge Structure

11.6.1 Total recoverable system costs would be in the order of $1.93 per unit. This is made up as follows:

Consumable costs	$0.56
Central staff and accommodation costs	$0.80
Amortisation of capital expend.	$0.57
	$1.93

11.6.2 On the basis of actual cash flow the savings in dollar cost to participating institutions has been calculated as in Table 2. This table assumes full cost recovery including overheads.

11.6.3 This is a saving of $1.00 per unit at a throughput of one million cataloguing operations per annum and represents a saving over present methods of 19%.

TABLE 2

SCHEDULE OF ESTIMATED CASH
SAVINGS BY USING THE PROPOSED
NATIONAL BIBLIOGRAPHIC SUPPORT SYSTEM
(using throughput volume of 1,000,000 units P.A.)

PRESENT STAFF COSTS OF PARTICIPANTS	PARTICIPANT STAFF COSTS USING BIBDATA	CENTRAL SITE COSTS	SAVINGS
$5,350,000	$2,420,000	$1,930,000	$1,000,000

(62)

APPENDIX A NATIONAL AGENCY CATALOGUING OVERLAP

A STUDY OF THE DUPLICATION RATE BETWEEN LC AND UK MARC TAPES

A study was done to determine the overlap between the LC and UK MARC tapes , i.e. how many titles on the BNB tapes were also catalogued by LC. The purpose of the study was to provide indicative data for the decision on database culling. No attempt was made to establish the incidence of overlap in other national agency records eg AUSMARC/LC MARC. This appendix briefly outlines the methodology of the study and the results obtained.

METHODOLOGY

A random sample of 800 titles was taken from the 1974 printed BNB annual.

These were searched by ISBN against the AMRS database with the 'LC only' option.

It was felt that the results produced by this exercise did not reflect the complete picture as many BNB titles could, in fact, be present on the LC tapes without ISBNs. This hypothesis was tested by:

i) running the same 800 requests against the AMRS database with the 'BNB only' option

ii) printing the 'hits'

iii) removing from these the records that were invalid on the LC run and also those which found hits on the LC run

iv) sorting and searching these records against the LC card file held at NLA.

Any matches found in this exercise could then be added to those matches found by ISBN search and the total expressed as a percentage of the total sample. A match is defined as the case where a card found in the LC card file was annotated MARC to indicate that an LC MARC record had been issued.

RESULTS

LC run.

Of the 800 requests, 97 produced hits (115 were rejected for technical reasons).

BNB run.

Of the 800 requests, 768 produced hits, 13 requests were invalid, 14 searches were unsuccessful, and 5 requests were accidentally omitted.

BNB hits searched against the LC card file. Of the 768 records printed from the BNB run, 178 were deleted as either found already by ISBN or invalidly requested in the LC run and therefore deleted from the sample, leaving 590 to be searched against the LC cards. The number of matches found was 188.

Total sample size.

This should be the 800 original requests less the 115 invalid requests on the LC run i.e. 685. The 32 non-matches on the BNB run coincide with the 115 found invalid on the LC run apart from 4 requests where the record was not found on the BNB tape but was found on the LC tape. These four should be removed from both the total sample (leaving 681) and from the 97 ISBN matches on the LC tape (leaving 93).

Percentage of duplication.

This will then be 93 + 188 divided by 681 and expressed as a percentage, or 41.3%.

Overall duplication in the data base.

It should be remembered that the 41.3% does not represent the percentage of duplication on the whole database but only the percentage of BNB records duplicated by LC records. The overall duplication rate on the BIBDATA base would be approximately 14% because of the ratio of LC records to BNB records.

APPENDIX B - PROJECTED INPUT VOLUMES

B.1 The number of records to be input to the system is contingent upon the level of cataloguing by the national agencies and by local users.

B.2 The initial data base size at system commencement is expected to be 1.4 million records. The derivation of this figure is given in Table B1.

TABLE B1

ESTIMATED DATA BASE INPUT VOLUMES
NATIONAL AGENCY SOURCES
(000's records)

YEAR	LC	UK	AUS	CANADA	TOTAL
AMRS Dec 1975	690	171	20	-	881
Expected Increase:-					
1976	107	37	9	11	164
1977	110	39	10	12	171
1978	114	41	11	13	179
Sub Total	1021	288	50	36	1395
Expected Input:-					
1979	117	43	12	15	187
1980	121	45	14	17	197
1981	124	47	16	19	206
1982	128	50	18	21	217
1983	132	52	20	23	227
TOTAL	1643	525	130	131	2429

References and Notes.

LC - Expected production figures are based on the receipt of 2000 new titles per week in 1975 with annual growth rate of 3%.
'Canadian National Data Base Study - Annex E'
'British Library MARC Services: a guide for intending users'.

UK MARC - Based on production of 35,000 new records per annum with a 5% growth rate.

'British Library MARC Services: a guide for intending users'

AUSMARC - Based on annual production of 8,000 records with an annual growth of 10%.

CANADIANA - Based on the Annual report of National Library of Canada 1973/74 with 10% growth rate.

B.3 On-line users of the BIBDATA system are expected to catalogue, for the period 1979 - 1983, the volumes set out in Table B2.

TABLE B2

ESTIMATED ANNUAL RATE OF CATALOGUING BY ON-LINE BIBDATA PARTICIPANTS (000's of records)

1979	1980	1981	1982	1983
75	800	900	1020	1100

These estimates suppose a phased introduction of users to the system.

B.4 A study of the NUCOM catalogue carried out in 1973 by Mr. C. Freeman of the National Library of Australia established that 67.6% of titles held were for works published in the United States, United Kingdom or Australia. A further 11.5% was published in other English speaking countries. It could therefore be expected that between 67.6% and 79.1% of the titles catalogued in Australia will have a corresponding MARC record. Current experience by the National Library using the Australian MARC Record Service has established a retrieval rate of 82% for the proportion of users intake which contains an ISBN or LC card number. It is considered that an assumption of 80% copy cataloguing availability from national agency sources is reasonable for the initial group of BIBDATA participants. This figure has been used for calculation purposes.

B.5 It is expected that clustering will apply to original entry records. The problem is to determine the number of unique titles which will be subject to original entry. The Freeman study established a percentage range for unique title holdings in the NUCOM catalogue. This range was between 42.8% and 43.3%. The mid-point of this range is 43.05%. If it is assumed that unique holdings are distributed uniformly between national agency and non-national agency records then the volume of records

subject to original data entry could be derived as follows:-

43.05% of 20% = 8.61% of annual No of titles

The validity of this calculation depends upon the number of non-national agency records input to the data base by participants. It also assumes a normal distribution. In view of the reduced user population in the BIBDATA system it is felt that the proportion of unique titles may be higher than that established for the total population. The number of unique holdings will also depend upon the commonality of the types of libraries using the system. Consequently the following percentages of annual titles catalogued have been used in the calculations.

TABLE B3

Year	% of annual cataloguing requiring original cataloguing expressed as a percentage of total cataloguing within the BIBDATA system
1979	20%
1980	15%
1981	14%
1982	12%
1983	10%

This illustrates the growth in the shared cataloguing aspects of the system.

Applying these percentage estimates to the estimated annual cataloguing rates given in Table B2 results in the estimated original entry volumes given in Table B4.

TABLE B4

ESTIMATED NUMBER OF RECORDS
REQUIRING ORIGINAL CATALOGUING
USING PROPOSED BIBDATA
SYSTEM

(000's records)

	1979	1980	1981	1982	1983
Original Entry	15	120	126	122	110

Based on the above tables the estimated total number of records to be input to the data base from all sources for the five year period 1979 - 1983 is given in Table B5.

TABLE B5

ESTIMATED NUMBER OF RECORDS ADDED
TO THE DATA BASE BY YEAR OF
ADDITION
(000's records)

SOURCE	1979	1980	1981	1982	1983
National Agencies	187	197	206	217	227
Original Entry	15	120	126	122	110
TOTAL	202	317	332	339	337

B.6 The average record size, as relates to data content only as distinct from control fields, has been calculated at approximately 320 characters. To this must be added control information which will increase the size of the record by approximately 180 characters. This then results in an average record size 500 characters. This average is applicable to National agency and original entry records. This size is based on the conventional MARC format. It is estimated that a 15% saving can be achieved by compaction on the data base without losing resolution. This compares to 22% saving by OCLC and thus could be considered conservative.

B.7 Location data entered into the system will account for a further increase in the data base size as will the input of individual call numbers. The impact of these fields has

been estimated as an increase of 8 characters for location data on average for each item catalogued by on-line users and an average size of 28 characters each for call number and associated data input by participants. In addition it is expected that there will be an increase in the data base size as a result of editing of data fields. This has been estimated on the basis of a 20 character amendment for 25% of records retrieved from the base by participants. The addition of local data as distinct from call numbers, location information and local amendment data is expected to add a further 30 characters per record retrieved from the base.

B.8 The estimated data base input, in characters is given in Table B6.

TABLE B6

ESTIMATED CHARACTERS TO BE INPUT TO THE BIBDATA SYSTEM CLASSIFIED BY INPUT SOURCE (millions of characters)

	1979	1980	1981	1982	1983
National Agency	93.5	98.5	103.0	108.5	115.5
Local entry	7.5	60.0	63.0	61.0	55.0
Location Data	0.6	6.4	7.2	8.2	8.8
Call No. Data	2.1	22.4	25.2	28.6	30.8
Editing	0.3	3.4	3.9	4.5	5.0
Local fields	1.8	20.4	23.2	27.2	29.7
TOTAL	105.8	211.1	225.5	238.0	242.8

B.9 Input to the system will be a combination of off-line and on-line operation. Off-line input will be performed during second shift operation. The source of off-line data will be the national agency tapes. The dissection of the total input volume between on-line and off-line is given in Table B7.

TABLE B7

DATA BASE INPUT ESTIMATES
CLASSIFIED BY METHOD
OF INPUT
(millions of characters)

	1979	1980	1981	1982	1983
OFF-LINE					
National Agency	93.5	98.5	103.0	108.5	113.5
ON-LINE					
Original Entry	7.5	60.0	63.0	61.0	55.0
Other	4.8	52.6	59.5	68.5	74.3
TOTAL	105.8	211.1	225.5	238.0	242.8

B.10 Additional characters will be input to the system as a result of authority file errors and as a result of general communications messages to the central control group. Location requests will also account for some message traffic on-line. These messages will not significantly increase the data base size but will have an effect on the message traffic. These types of messages have been included in Appendix F relating to telecommunications network traffic.

SECTION C - OUTPUT PRODUCTS

C.1 DISPLAY SCREEN OUTPUT

This section lists a hypothetical series of display screens through which BIBDATA participants could communicate with the on-line system. This appendix is only included to provide a practical example of how BIBDATA might look but there is no commitment to this model. This appendix is for illustrative purposes only.

Each screen is described by a general explanation of the use of the screen, a list of the data elements included on it and a list of the actions which the user may employ in answer to the screen (under the heading Input Options).

Attachment 1 gives an example of each screen and Attachment 2 charts the logical flow from screen to screen during use of the system.

C.1.1 SIGN-ON

This screen must be employed as the entry point to the system. Through it the user is identified to the system and his normal options (held by the system as his user profile) can be linked to the particular terminal. The user is also alerted to any general or particular messages of interest to him and then passes on to the function selection screen.

Connect by giving sign-on code - following screen reply:

1. Sign-on code displayed (includes such elements as System (BIBDATA), Institution, Sub-institution, individual code no., level.).

2. Diagnostic msg. (e.g. Sign-on code not recognized - please try again).

3. General msg. - (e.g. Welcome to BIBDATA).

4. Daily msg. to all users - (e.g. Please note that system will not operate on Xmas Day).

5. Notification of msg. from Central - (e.g. Message screen contains (n) messages from Central).

C.1.2 FUNCTION SELECTION

This screen is the basic menu screen and acts as a branching

point to all available BIBDATA functions. The user selects the function he wishes to use, keys in its number as quoted on the screen and, in the case of functions 1-15, follows this by the search term e.g. by entering 20642990638 the user is requesting a search of the database for a record with an ISBN of 0642990638. It is not expected that functions 10-12 will be offered in the early stages of the system.

1. Header (e.g. FUNCTION SELECTION)
2. Standard error diagnostic window
3. BIBLIOSEARCH
    1. BIBDATA record no.
    2. ISBN
    3. LC Card No.
    4. BNB No.
    5. Other access no.
    6. Author
    7. Title
    8. A/T
    9. Series title
    10. LCSH
    11. LC Class
    12. DC Class
4. AUTHORITY FILES
    1. Name authority file
    2. Series authority file
    3. LCSH authority file
5. HOLD-QUEUE
6. MESSAGE SCREENS
7. CATALOGUE ACTION

8. Worksheet screen

9. MANAGEMENT INFORMATION

1. Volume Stats.

10. TRAINING

11. SIGN-OFF

C.1.3 CATALOGUE DISPLAY 1 In the initial version of the system the normal object of a search will be to retrieve a unique item. However this will not be achieved in all cases e.g. in an author/ title search. In such cases a shortened form of the retrieved records will be displayed on this screen and the user will then choose the record for which he wants a full display by keying the item number as displayed. In the example given below a simple truncated search-key of MAR/JOI was assumed.

Where the number of items is greater than can be displayed on 1 screen the user may scroll through the entire list by use of the 'f' and 'b' input options. This screen would be bypassed in the case of:

i) A zero retrieval, where this fact would be signalled on the Error Diagnostic area of the Function Selection Screen.

ii) A unique retrieval, where a full display (CATALOGUE DISPLAY 2) will be given immediately.

Elements are:

1. Title

2. Error diagnostic area

3. No. of items retrieved

4. List of items

i) item number

ii) data field (e.g. author, title, edition, imprint - to be truncated after two lines).

5. Input Options

i) Supply item no. for full display

ii) f = forward

iii) b = backward

iv) s = return to functional selection screen.

C.1.4 CATALOGUE DISPLAY 2

This screen displays a full record retrieved from the database. It is intended to be used copy cataloguing as well as for inter-library loan and other informational purposes. The record is presented in MARC format and may be amended or added to on screen to conform to a particular user's requirements. It should be remembered that such amendments will affect only the user's version of the record and not the database version. If the participant wishes to amend the central record for the benefit of other users he must use either the BAF Advice Screen or the Message to Central Screen. Exit from this screen is by either the Function Selection Screen or the BAF Display Screen. Elements are:

1. Title (e.g. CATALOGUE DISPLAY)
2. Error or diagnostic area
3. Fixed field information e.g.
   1. Type
   2. Bibl. level
   3. Language
   4. Form
   5. Int. level
   6. ISBN
   7. LC Card no.
   8. BIBDATA no.
   9. Cat'g source

   (Note: this area is displayed for information only and would not normally be subject to editing by participants).
4. Variable field data e.g.
   1. Field number

2. Tag

3. Indicators

4. Data (incl. sub-field codes)

(Note: These fields may be edited by overwriting).

5. Holdings

1. Own holdings

2. Other library location symbols

(Note: if the signed-on library holds this record this should be displayed as:

i) library symbol

ii) shelf number

iii) no. of copies

iv) archive indicator - noting that the library's archive copy of the record differs from the displayed form.

Other library symbols should be in the simple form only.)

6. Bibliographic Error Display

On request for output (by inputting p, a or o below) the record is subject to validation, and any validation errors would be noted on the line on which they occur - as a numeric code in the last three characters of the line. Record can then be edited and re-input.

7. Input Options

1. f = forward to overflow screen

2. b = backward

3. c = cancel

4. o = request for output production

5. p = output production over-ride - over-ride parameter to be supplied (e.g. 2 sets of card required for this particular item

rather than the single set specified in the user's profile as normal output option).

6. a = BAF option over-ride - as above

7. n = name authority file

8. s = series authority file (supply 'n' or 's' with search key to retrieve a section of the authority file - biblio. record will be stored and can be returned to from the authority file display screen).

9. r = archive display ('r' will cause the displayed record to be amended to the archived version).

(Note: i) Commands 'p' and 'a' imply an 'c' command.

ii) All commands except 'n' and 's' will cause a function selection screen to be returned.

C.1.5 BAF DISPLAY

This screen, accessed from either the Function Selection screen or from Catalogue Display 2, will present a section of the relevant BAF (BIBDATA authority file) in traditional format (authoritative form with tracing notes, reference entries from non-preferred forms, history notes). An authority file access will cause the display of about 15 lines of the file arranged alphabetically.

Elements:

1. Title

2. Error diagnostic area

3. Sub-title (e.g. Name Authority File)

4. List of items displayed

    1. item number

    2. level indicator (e.g. 1 = BAF, 2 = Temp.)

    3. data

5. Level indicator (where a particular entry contains history notes these are not immediately

displayed, but their presence is indicated by an asterisk after the entry. The full entry can be retrieved by using the 'n' command with the appropriate entry number for the screen e.g. n4).

6. Input Options.

i) enter search term (to retrieve another section of the same authority file)

ii) f = forward scroll

iii) b = backward scroll

iv) h = hold-queue record

v) s = return to function select screen

vi) e = error report screen (supply line no. e.g. e3)

vii) a = additional report screen

viii) o = output (requesting BAF sets - giving line no. and no. of sets required)

ix) n = retrieve full record (supply line no. e.g. n4)

Note: 1) This is a general screen which should apply to Name, Series, and Subject authority files equally well.

C.1.6 BAF ERROR REPORT

This screen, accessed from the BAF Display Screen, is used to report any errors detected on the BIBDATA authority files. A maintenance section at NLA will receive all such reports and make the necessary changes to the authority files. The reporter has the incorrect form automatically transferred by the use of the 'e' option on the BAF Display Screen, inserts the correct form in the 'SUGGESTED FORM' block, and gives brief reason for the amendment. Elements:

1. Title

2. Error diagnostic area

3. Previous form - a display of the present authority file form (with overflow msg. as required)

4. Suggested form (Re-input of the full record)

5. Reasons for amendment (User's explanatory message to BAF maintenance section)

6. Input options

h = retrieve hold-queue record

t = transmit

c = cancel

f = forward

b = backward

(NOTE: 1) Transmission of this screen should result in an immediate alteration of a level-1 BAF entry to level-2 (temporary, pending checking by BAF maintenance staff).

2) Sections 3, 4 and 5 above to be allocated as blocks - if insufficient room a second screen may be requested by use of the 'f' command.

3) On either a cancel or a transmit command the user is returned to the function select screen.

4) On 'h' command the report is transmitted and the 'held' screen is returned.

C.1.7 BAF ADDITION REPORT

This screen caters for the case where a participant finds that additional references are required to a heading which is established on the authority file or to one which is about to be established by virtue of being included in a database record retrieved for the first time. Entry will have been made through the BAF Display Screen where the entry was checked. It is expected that the existing form will be able to be transferred from the BAF Display screen where it exists, the addition being then made in the same format. If additions are being made to an entry which is about to be added to the authority file from a retrieved record then the whole authority file entry should be made in authority file format, and the BIBDATA number of the originating record quoted. Elements:

1. Title

2. Error diagnostic area

3. Entry data

4. Originating record number

5. Reasons for addition

6. Input options

    h = retrieve hold queue record

    t = transmit

    c = cancel

    f = forward

    b = backward

C.1.8 INPUT WORKSHEET

This screen is to be used for input of original cataloguing where the record has not been found on the database. The format in which this data is entered will be MARC (see section on Input for information on the allowable fields - full details of input format will be supplied in a user manual). Some data would normally by written by the cataloguer on a pre- printed worksheet and copied to the terminal. Elements:

1. Title

2. Error diagnostic area

3. Fixed fields

    i) Type

    ii) Bibl. level

    iii) Language

    iv) Form

    v) Int. level

    vi) ISBN

    vii) LC Card

    viii) Catalogue source.

4. Variable fields

5. Bibliographic error display (as for Catalogue Display 2)

6. Input Options

i) c = cancel - causes return to function select screen without further system action.

ii) h = hold-queue

iii) o = request for output

iv) p = option over-ride

v) a = BAF output option over-ride

vi) f = forward - interpreted as a request for an additional screen or a move to an additional screen which has been already requested e.g. if a second screen is needed to complete the cataloguing of an item the 'f' command should cause the first screen to be stored pending a request for output.

If this request is transmitted with the second screen then the two screens of data will be first joined together as one record.

vii) b = backward - if a second screen is required then a user may wish to move back to the first screen to amend information on it. This command will cause the second screen to be stored and the first retrieved. Output commands should be able to be transmitted from either screen.

viii) n = name authority file

ix) s = series authority file ('n' and 's' to be used as in Cataloguing Display 2)

Note: 1) Other notes explaining input options on screen 4 (Catalogue Display 2) also apply here.

2) End-of-field characters should not be required as sufficient logic should be present within the record to allow automatic insertion of these characters.

C.1.9 MESSAGE SCREEN

This screen may be used by either participants or Central. Here are some examples of use:

TERMINAL USER

1) Reporting systems problems e.g. 'Error msg. received on all searches

2) Bibliographic error report e.g. 'Record no. 12345 in error - tag 245 should read 'Hunters of the Amazon'.

3) General message e.g. 'Pls. delete ANL from records 12345, 24680, 13579 etc.'.

4) Inter-library loan - in later stages of the system it is intended that libraries will be able to communicate with each other rather than with Central only.

5) Reply to msg. from Central.

CENTRAL

1) Unsolicited messages re systems problems e.g. 'system will be shut down for 30 minutes from 3.30'.

2) Replies to messages received.

3) Queuing of non-urgent messages (as noted to user on sign-on screen). This screen is always accessed from the Function Selection Screen and returns either to this screen or to another message screen.

Elements:

1. Title

2. Error diagnostic area

3. Message destination (to be used by Central operators but not by terminal users during Stage 1)

4. Message class (this should always be supplied as a number, from the following alternatives:

1. Partial system failure

2. Other messages requiring immediate answer

3. Bibliographic error notification.

4. General comment).

5. 'Reply to message no.'

6. 'At time'

7. 'On msg, levl.' (The above three fields will always be filled in by the Central operator and numbers 5 and 6 may be used by the terminal user as required).

8. QUEUED MSGS. (This will indicate the number of non-urgent messages being stored awaiting action)

9. MSG. AREA

10. Input options

i) c = cancel

ii) f = forward

iii) b = backward

iv) t = transmit

v) n = display next queued message

vi) s = store message on queue

vii) h = hold

C.2 LINE PRINTER OUTPUT

C.2.1 CARDS

C.2.1.1 While BIBDATA is envisaged primarily as an on-line controlled dispenser of bibliographic records in machine-readable format to service institutional and regional library systems, NLA will make its Card Service programs available and will act as a processing bureau for those libraries requiring traditional catalogue card output.

C.2.1.2 PHYSICAL CHARACTERISTICS. As for NLA Card Service.

C.2.1.3 PRODUCT DELIVERY. Cards produced by NLA will be printed during over-night batch runs and will be despatched the following day. The two types of cards offered will be catalogue sets and authority file/reference sets.

C.2.1.4 CATALOGUE SETS. Production of card sets will be done via the Card Service program as mentioned above. Input to these programs will be supplied by the BIBDATA system in the form of selected MARC records together with library identification and format option information.

C.2.1.5 REQUEST FOR OUTPUT. Output is requested by the use of the appropriate screen command (see C.1.4 and C.1.8). Hardcopy output options should be specified in the appropriate section of the institutional profile and will thereafter be the system default for that institution. The option chosen may be overridden for particular records by the use of the 'p' command on the Catalog Display 2 screen (see section C.1.4 on Screen output.

C.2.1.6 DATA. The bibliographic information to be included on the cards will be under the control of the individual library, being either the record as entered on screen by original cataloguing or the record as retrieved from the BIBDATA database and edited on screen (see section C.1 on Screen outputs).

C.2.1.7 CARD LAYOUT. As for NLA Card Service - examples given in C.2.1.12.

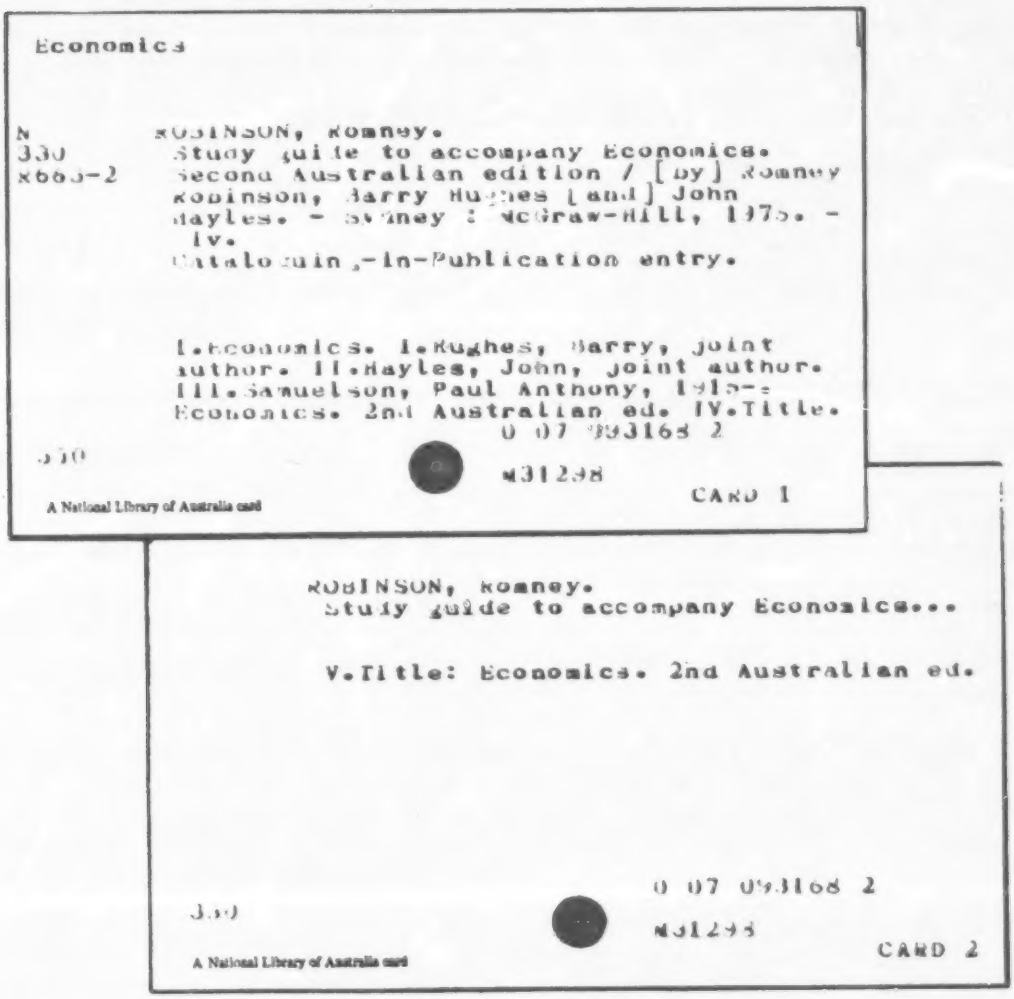
C.2.1.8 FORMAT OPTIONS. Format options currently offered to NLA Card Service customers will also be available to BIBDATA users. Format options are to be supplied to the system as part of an institutional profile, and may be overwritten on screen for individual records (see section C.1 on Screen Outputs).

C.2.1.9 SETS. A 'set' of cards is defined as a number of identical cards, the number being governed by the number of entry points in the record.e.g. a record containing a main author, two secondary authors, a distinctive title, a series entry and two subject entries will generate seven cards for the above plus an extra card for the shelf-list giving a set of eight cards in all. Some set options may also be specified with the format options mentioned in para. 3 above.

C.2.10 CARD ORDER. Batches of card sets will be supplied in rough sorted order by main entry, control no., title etc., as specified in the format options.

C.2.1.11 CHARACTER SET. As for NLA Card Service.

C. 2.1.12. Examples



Economics

N
330
R663-2

ROBINSON, Romney.
Study guide to accompany Economics.
Second Australian edition / [by] Romney Robinson, Barry Hughes [and] John Hayles. - Sydney : McGraw-Hill, 1975. -
iv.
Cataloguing-in-Publication entry.

1.Economics. I.Hughes, Barry, joint author. II.Hayles, John, joint author. III.Samuelson, Paul Anthony, 1915-. Economics. 2nd Australian ed. IV.Title.
0 07 093168 2

330

M31298

CARD 1

A National Library of Australia card

ROBINSON, Romney.
Study guide to accompany Economics...

V.Title: Economics. 2nd Australian ed.

0 07 093168 2

330

M31298

CARD 2

A National Library of Australia card

Seal books

N+
994.295
L817f

LOCKWOOD, Douglas Wright.
The front door, Darwin, 1869-1969 / [by] Douglas Lockwood. - Adelaide : Rigby, 1974,c1968. - 288p. : 20p. of plates ; 18cm. - (Seal books)
Bibliography: p.274-275.
Index
Reprint of 1968 ed.

1.Darwin - History - 1869-1969.
I.Title.
0 85179 622 2

994.295[5]

M27792

A National Library of Australia card

AUTHORITY FILE OUTPUT

C.2.1.13 DEFINITION. An authority file is defined as a file of records which contains the authoritative form of entry of any item of data on the main bibliographic file. A reference note to that form of entry from an alternative (i.e. non-preferred) form for the same data may also be required.

C.2.1.14 SCOPE. Initially BIBDATA will maintain only name and series authority files. The maintenance of a national subject authority file will be the subject of a later study. Catalogue card output will be available from these files.

C.2.1.15 MAINTENANCE. Responsibility for maintenance of the BIBDATA authority files will be shared by all BIBDATA users. Where a participant is the first user of a record (i.e. it bears no other library locations) he has the responsibility to check all relevant entry points on the record and issue an error report to the central office where necessary. NLA will maintain a staff to check all error reports and make the necessary amendments to the data base. While participants may choose (by editing on screen) to disagree with the BIBDATA authority files, these variant entry forms although included in the catalogue product supplied will not be recorded on the authority files and will not be available as authority file output products.

C.2.1.16 PRODUCT DELIVERY. The system will record the use of each authority file entry form by each participant and will be able to produce a set of authority file cards for the participant on the occasion of his first use of that entry form. Libraries may elect to accept this service by filling in their institutional profile appropriately . Various 'set' options are available in the institutional profile e.g. it will be possible to ask for one entry card with tracings and three sets of references as normal output for each new entry form. Users may override their standard choice by the use of the appropriate command on screen e.g. when a requested record has been displayed on 'Catalog Display 2' screen, a user may decide to request an extra set of authority cards for this particular item and does so by use of the 'a' command and the appropriate override information (see section C.1 on Screen Output).

C.2.1.17 OUTPUT PRODUCTS. The two standard forms will be offered, viz. entry card with tracing notes and reference cards. e.g.

Barros, Frederico Pessoa de :: Pessoa de Barros, Frederico x De Barros, Frederico Pessoa

De Barros, Frederico Pessoa
See Barros, Frederico Pessoa de

Pessoa de Barros, Frederico
See Barros, Frederico Pessoa de

C.2.18 UPDATE SERVICE. An update service will be offered to all users of BAF output (i.e. both full-time and occasional users). Where users have opted to accept this service they will automatically receive new authority file output whenever an entry which they have used has been changed in any way. The new set will note revision and date of revision. History note references will be used in the normal way e.g. where a government instrumentality has changed its name the entry card for the old entry form will be re-issued with a history note saying that all works after a certain date will appear under the new entry form. Authority sets for this new entry form will be issued on first use of that entry in the normal way.

C.2.1.19 CARD ORDER. Batches of authority cards will be supplied in rough sorted order by preferred entry form (sets being kept together.). Update cards will be issued as a separate run following new entry sets.

C.2.1.20 CHARACTER SET. As for catalogue card output.

C.2.2 STANDARD STATIONERY OUTPUT PRODUCTS

A number of output products will be produced on standard computer stationery (fanfold, 15 x 11, 133 characters/line, 65 lines/ page). These will take the form of logs of system activity for control purposes under the following headings:

1. System log
2. BAF Maintenance log
3. Message log
4. Customer stats. log
5. Customer account

The first three above are required by the processing centre for control of the whole system, while numbers 4 and 5 are required by individual participants for their own purposes.

C.2.2.1 System log. During the normal operation of the system counts will be kept of a number of system uses. These counts will then be available for printing on request at the central site for monitoring purposes. Actions to be monitored will be:

i) Message traffic through the telecommunication network

a) total

b) by user

c) by msg. class

ii) IO operations incurred

a) total

b) by user

iii) No. of catalogue cards produced

a) total -

1. bibliographic

2. authority file

b) by user -

1. bibliographic

2. authority file

iv) No. of machine-readable records output

a) total

b) by mode (on-line/off-line)

c) by user

v) No. of records added to the data base

a) total

b) by national agency

c) by user

vi) No. of locations added to NUCOM***

a) total

b) by user

vii) Current size of database

viii) Current size of NUCOM

ix) No. of validation errors detected

a) total

b) by error class

c) by user by error class

x) No. of records archived

a) total

b) user

xi) No. of retrieval requests

a) by search category by successful/unsuccessful **

b) by user by search category by successful/unsuccessful

NOTE: * All categories could supply two figures, viz.

1) a 'last period' figure

2) a cumulating total figure.

** These figures need be given for last period only.

*** The national union catalogue as built up by BIBDATA.

C.2.2.2 BAF MAINTENANCE LOG. To provide control information for the maintenance of the BIBDATA authority files the following data should be kept by the system and printed on request for each authority file:

i) Total no. of authority file entries by level

ii) No. of changes to file
a) New entries by entry/reference b) Amendments by entry/reference

iii) Alpha-sorted list of new entries (containing verification source)

iv) Alpha-sorted list of amended entries (new entry form with x-refs followed by old entry form

with x-refs and verification source)

NOTE: 1) This listing may also be of use to participants

2) The displayed authority file record should contain the date of entry or last update allowing a check back to this listing where necessary.

C.2.2.3 MESSAGE LOG. Messages will be transmitted to and from NLA via Screen 9 (see section on screen outputs). These messages will be queued awaiting reply and should be logged after reply, with the log being printed on demand (and thereby cleared). This listing should then be kept for a period.

Messages should be listed in separate runs by message class and, within these, by date of acquittal.

The message to Central and its reply should be printed together. Therefore, elements to be printed in this list are:

i) Message class (see screen 9 for details)

ii) Date/time (both transmission and acquittal times to be given)

iii) Sign-on code of sender

iv) Text of transmission message

v) Text of acquittal message.

C.2.2.4 CUSTOMER STATS. LOG. The purpose of this listing is to give each customer (distinguished by institution segment of the sign-on code) a summary account of his use of the system. The following information should be logged to be printed on a regular basis:

i) Total no. of titles held on archive

ii) No. of output products required during period by class

iii) The following input statistics to be arranged by individual sign-on code:

a) No. of titles added to NUCOM

b) No. of copy catalogue records added

c) No. of original catalogue records added

d) Copy/original as %

e) Elapsed time used

f) No. of successful retrievals by term-type

g) No. of unsuccessful retrievals by term-type

h) No. of BAF error reports

i) No. of BAF screens accessed

An institutional total should be given for each of the above categories.

C.2.2.5 CUSTOMER ACCOUNT INFORMATION. While in the early stages it does not appear worthwhile to print accounts automatically on special stationery it will be necessary from the beginning to supply all customers with an itemized list of the components of the invoiced amount. Elements involved are:

i) Period covered

ii) Balance brought forward

iii) Date of last payment

iv) Total amount charged for this period

v) Itemizing of above by charge unit

(e.g. 1. Data base accesses by access no. - $25.60

by author/title - $23.80

2. Authority file accesses $10.20

3. Card production $30.50 etc.)

C.3 MACHINE-READABLE OUTPUT PRODUCTS

Machine-readable records in a standard format will be available as output products from the system for those participants capable of using these records in their own automated systems.

In addition BIBDATA will hold an archive copy of all records required for output by each participant as backup for the users of machine-readable records and as a means of storage for those users who have not yet converted to an automated system.

FORMAT. While machine-readable output may be delivered in various ways both off-line and on-line, a standard MARC

structure (as used by the current AMRC service) will be used for all records.

C.3.1 MAGNETIC TAPE OUTPUT

C.3.1.1 PRODUCT DELIVERY. Off-line product delivery will be given on magnetic tape. Tapes will be written to during the overnight batch run and will be despatched weekly, or more frequently on negotiation. It is expected that both 7 and 9-track will be supported.

C.3.1.2 CONTENT. Two types of record will be available for supply on tape:

bibliographic records and authority file amendment records.

C.3.1.3 Bibliographic records will contain all data present on the screen from which output was requested i.e. all information entered from original entry records, or all data as edited from records retrieved from the database including local data fields. Where it has been found necessary to correct a record on the database, all participants who have previously received this record will automatically receive a copy of the new record appropriately marked in the header as an amendment record.

C.3.1.4 All bibliographic records, unless otherwise altered on screen, will reflect the current state of the BIBDATA authority files, therefore tape-service customers should be able to handle their own authority file requirements automatically. However they may wish to be notified of amendments made to entry forms supplied to them on previous records. This will be done by the use of an amendment record in a pseudo MARC format containing in the variable field area only the relevant fields in both the old and the amended form.

C.3.1.5 ORDER OF RECORDS SUPPLIED. No sorting will be done on these records.

C.3.2 ON-LINE OUTPUT

C.3.2.1 The system will supply some form of on-line product delivery for the sophisticated user e.g. delivery of output records to a cassette tape unit on site. Delivery will be on-line but not real-time i.e. records will be held on a low-priority queue at the central site and sent down line whenever no higher priority work is waiting to be done.

C.3.2.2 Content will be identical to that of records sent on mag. tape.

C.3.3 ARCHIVE OUTPUT

C.3.3.1 Participants will be offered the facility to archive a copy of all records for which they have requested output. This copy will be held in machine-readable form, and will contain all data as edited by the participant.

C.3.3.2 It is planned that archived records be available to users on-line (see Catalogue Display 2.). However restrictions may need to be put on this facility if the volume of use becomes too large.

C.3.3.3 According to the method envisaged for on-line archiving the participant will be able to:

a) Retrieve a record.

b) Note that he already has the material described by that record.

c) Note that at the time of his original use of the record he decided that some editing was required on the record for his library's purposes.

d) Request display of his own version.

e) If necessary amend his archive record.

f) If necessary request output of the new form.

C.3.3.4 Subject to negiotiation a participant's full file may be supplied in machine readable form.

C.4 OTHER OUTPUT PRODUCTS

The system is hospitable to the production of many more output products such as microform and printed book catalogues, authority files and shelf lists, book pockets, labels etc., order forms, lists of unlocated research material, duplicate lists, subject guide cards, other lists to aid co-operative acquisitions and weedings projects

However it was not considered necessary to discuss these in detail at this stage. These will be explored in depth during detailed specification work.

Attachment 1:1
SIGN ON SCREEN

NLA3
error message if required e.g. sign on not recognised
general messages e.g. system recognition, daily information messages
notification of number of messages waiting for user from central site

s = function select screen m = message screen

Attachment 1:2

FUNCTION SELECTION

ERROR DISPLAY AREA

BIBLIO SEARCH
1. BIBDATA record number
2 ISBN
3. LC card number
4. BNB number
5. Other access numbers
6. Author
7. Title
8. Author/Title
9. Series Title
10. LCSH
11. LC Class number
12. DC Class number

AUTHORITY FILE SEARCH
13. Name
14. Series
15 LCSH

HOLD QUEUE
16.

MESSAGE SCREENS
17.

CATALOGUE ACTION
18. Worksheet

MANAGEMENT INFORMATION
19. Volume statistics

TRAINING
20.

SIGN OFF
21.

enter line number/search term

Attachment 1:3

CATALOGUE DISPLAY 1 ERROR DISPLAY AREA

Search term MAR/JOIN No. of items retrieved 4

1. Marsden, J.A. Joining the Team. 3rd ed. New York, Academic, 1975
2. Martin, Edben Joinery for all. Lond. Smith, 1970
3. Marshall, A.A. Joint Action Probe, N.Y., Smith, 1976
4. Martinhoff, A.H. Joints of New York. N.Y., Smith, 1976

Supply item number for full display
f = forward b = backward s = return to function select screen

Attachment 1:4

CATALOGUE DISPLAY 2 ERROR DISPLAY AREA

Date: s1975 Bibl lvl: Lang: eng Form: Screen 1 of 2
Int Lvl: ISBN: 0642009481 LC Card No.
BIBDATA No. 0642009473 Catlg Source: ANB Record Checked: Y

1. 016 00 $b 01368
2. 082 01 $a 341.754 $b 0266 $b 94 $b 0431
3. 110 01 $a Australia $b Treaties, etc $1 German Democratic Republic $m February 28, 1974
4. 245 01 $a Trade agreement between Australia and the German Democratic Republic (Berlin, 28 February 1974). Entry into force 28 February 1974 $c Department of Foreign Affairs

NPL341.7544AUS/2* ANL ANU NUN VPL

c = cancel n = name authority file s = series authority file o = request for output p = output option override a = BAF option override
f = forward b = backward r = retrieve archive record

CATALOGUE DISPLAY 2 ERROR DISPLAY AREA

Screen 2 of 2

5. 260 00 $a Canberra $b Australian Government Publishing Service $c 1975
6. 300 00 $a 5p. $c 25cm.
7. 350 00 $a Unpriced
8. 490 01 $a Treaty Series; 1974, No. 7
9. 651 00 $a Australia $x Commerce $z Germany $x Law and Legislation
10. 810 10 $a Australia $c Dept. of Foreign Affairs $u Treaty Series $v 1974, no. 7

c = cancel n = name authority file s = series authority file o = request for output p = output option override a = BAF option override
f = forward b = backward r = retrieve archive record

Attachment 1:5

NAME AUTHORITY FILE

ERROR DISPLAY AREA

```
1   1   $a Helm $h Ann
2   2   $a  Helm $h John
3   1   $a Helmm $h Anthony
4   1   $a Helmore $h Basil Arthur
5   1   $a Helmore $h Sidney Robert
          x$a Johnson $h Sidney Robert
6     ....................
7     ....................
...
...
...
...
...
...
...
...
```

enter search term or
f = forward b = backward h retrieve hold queue record s = function select
e = error report screen (with line number) a = addition report
o = output n = retrieve full record (with line number)

Attachment 1:6

BAF ERROR REPORT

ERROR DISPLAY AREA

PREVIOUS FORM
$a Helmore $h Basil Arthur

SUGGESTED FORM
$a Helmore $h Basil Arthur Seymour

REASON FOR AMENDMENT
Alternative form of name given in introduction

f = forward b = backward h = retrieve hold queue record t = transmit c = cancel

Attachment 1:7

BAF ADDITION REPORT

ERROR DISPLAY AREA

$a National Health and Medical Research Council
x $a Australia $c National Health and Medical Research Council

ORIGINATING RECORD NUMBER 0123456

REASONS FOR ADDITION

h = retrieve hold queue record t = transmit c = cancel f = forward
b = backward

Attachment 1:8

INPUT WORKSHEET

ERROR DISPLAY
AREA

Type: Bibl lvl: Lang: Form:
Int lvl: ISBN: LC Card No: Catlg Source:

c = cancel h = hold queue o = request for standard output
p = non-standard output a = non-standard BAF output f = forward b = backwar
n = name authority file s = series authority file

Attachment 1:9

MESSAGE SCREEN

ERROR DISPLAY AREA

MSG DESTINATION:
MSG CLASS:

REPLY TO MESSAGE No.:
AT TIME:

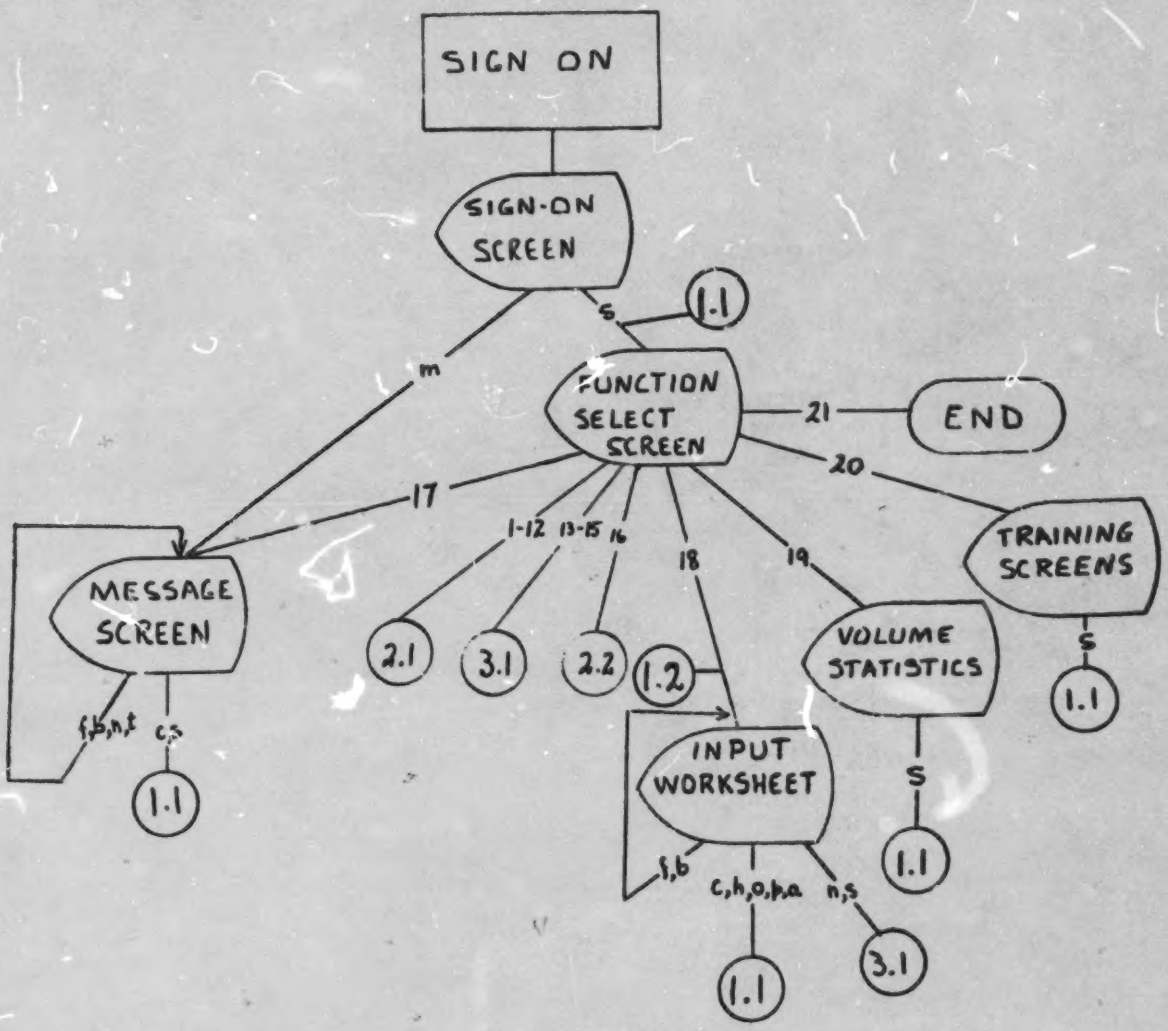
QUEUED MESSAGES

MESSAGE AREA:

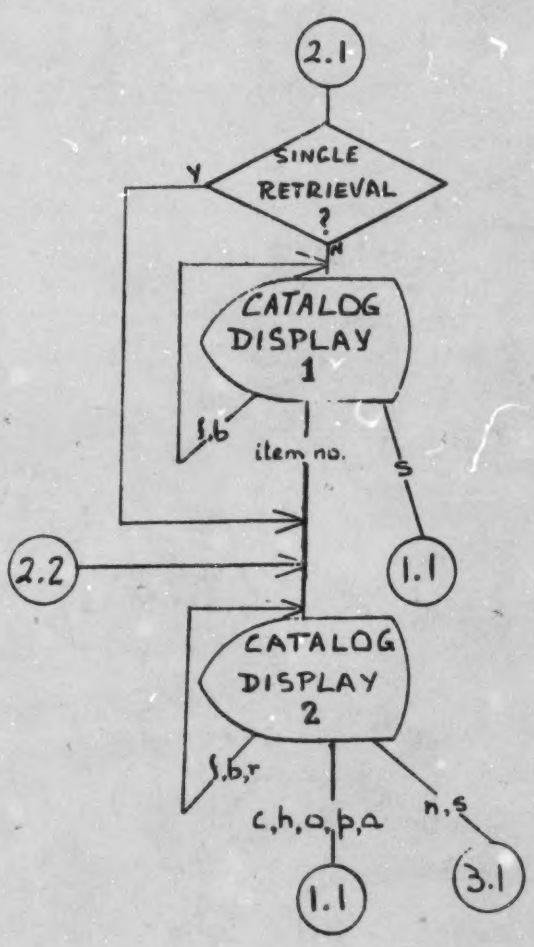
c = cancel f = forward b = backward t = transmit n = display next message
s = store message h = hold

Attachment 2 : 1

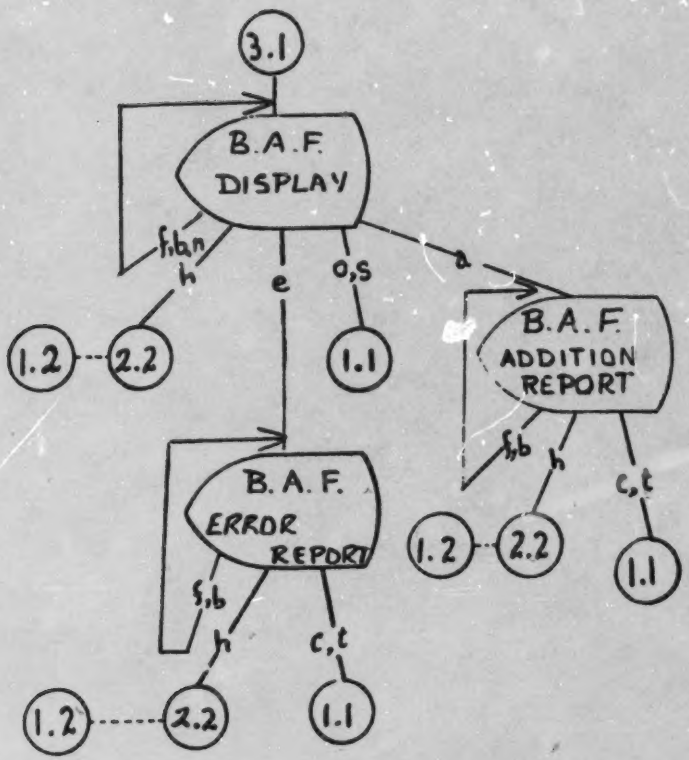
SCREEN TO SCREEN FLOW IN BIBDATA

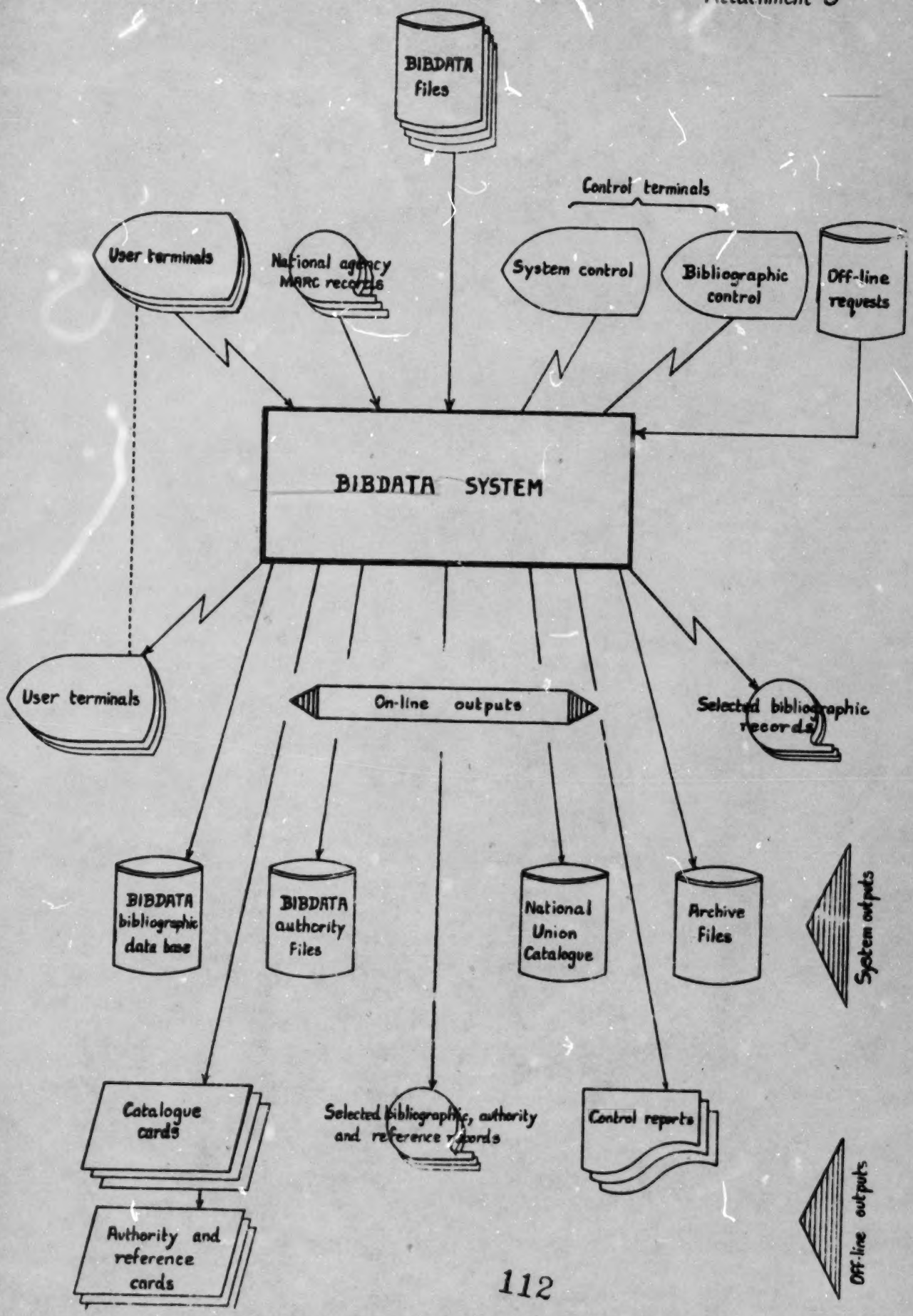


Attachment 2 : 2



Attachment 2 : 3




BIBDATA files
Control terminals
User terminals
National agency MARC records
System control
Bibliographic control
Off-line requests
BIBDATA SYSTEM
User terminals
On-line outputs
Selected bibliographic records
BIBDATA bibliographic data base
BIBDATA authority Files
National Union Catalogue
Archive Files
System outputs
Catalogue cards
Selected bibliographic, authority and reference records
Control reports
Authority and reference cards
Off-line outputs

APPENDIX D

OUTPUT VOLUMES

The purpose of this appendix is to give some basis on which to predict output volumes required from the system as the number of users increases. Accordingly a group of 20 libraries has been chosen from among those answering the BIBDATA questionnaire. These libraries reflect as closely as possible the spread of potential users of the system. Output volumes are calculated for this group as a basis for extrapolation to groups of any size.

D.1 GENERAL STRATEGY

1.1 Each type of output volume was examined separately, the types being identified as in Appendix C:

a) card

b) Tape

c) On-line records

d) Line-printer

e) Screen

f) Archive

D.1.2 A representative list of libraries was produced from among the list of libraries receiving the BIBDATA questionnaire. All totals have been expressed in terms of this group.

D.1.3 The elements involved in the building of a computational model were identified. These elements take the form of constants such as the average number of catalogue cards in a set and variables such as the number of items catalogued in a year by each library.

D.1.4 Values were given to the elements in the form of a substantive figure for the constants, and a table of elements by customer for the variables. The computational model to calculate the output volumes for each library and the total for the output type was produced.

D.1.5 A derived constant may then be calculated from these totals allowing extrapolation to be made to expected first-year volumes, second year volumes etc.

D.2. CARD OUTPUT VOLUMES

D.2.1 Two types of card usage were involved, viz. catalogue cards and authority cards. A catalogue card set may include cards for entry by author, title, series and subjects, and may also include a card for a shelf-list. An authority card set may include cards for both the authority file and the catalogue.

D.2.2 Constant elements:

a) Average number of cards in a catalogue card set (6).

b) Ratio of authority file cards created to titles catalogued (55%). *

c) Average no. of catalogue correction sets required expressed as a percentage of the total volume (5%).

d) Average no. of authority correction sets required as a percentage of total volume (5%).

e) Average no. of lines per catalogue card (15).

f) Average no. of lines per authority card (2.25).

D.2.3 Variable elements:

a) No. of titles catalogued per annum for each library.

b) No. of duplicate catalogue sets required per annum for each library.

D.2.4 Computational model (2A x ((3A+3B) + (2C x (3A+3B)))) + (2B x (3A+3B)) + (2D x (2B x (3A+3B))) (Where 2A = the value of the element described in 2.2 a) etc).

e.g. assuming an average of six cards per catalogue set, 5% of catalogue sets to be re-issued as correction cards, 5% of authority sets re-issued as correction cards, 10,000 titles per annum catalogued by the library and 3,000 additional sets required for branch library catalogues and authority files, then the above formula would apply as:

(6 x ((10,000 + 3,000) + (.05 x 13,000))) + (.55 x 13,000) + (.05 x .55 x 13,000)

or 89,407 cards per annum for this library.

D.2.5 This total may also be expressed in terms of lines printed by using the constants 2E and 2F.

D.2.6 The total card output from the system for the chosen group of libraries was the sum of the totals of all libraries within the group for whom catalogue cards were a requirement, i.e. although only a percentage of the

libraries in the group required catalogue cards, the total of cards required by those libraries has been expressed as the card requirement of the whole group.

D.2.7 The above computational model has been applied to the volumes and requirements of the 20 sample libraries and the results of this and the computational models below are given in the table at Attachment 1.

D.2.8 Derived constant. A constant may be derived from the table given at Attachment 1 to allow extrapolation to various volumes of traffic viz. that the number of cards to be produced for the average mix of library participants will be 6.51 times the number of titles p.a. catalogued by those libraries. Using this constant it could be predicted for the 57 libraries who responded to the BIBDATA questionnaire with a projected annual intake of 877,200 titles that their card production requirements would be 5,700,000 cards p.a. The constant in terms of lines printed is 58.78 times the number of titles with an extrapolation to the 57 libraries of 51,563,000 lines printed per annum.

* A recent survey conducted at NLA showed that 100 monograph titles produced a possible 136 entries in the Name Authority File, of which 57 were already in the file and 79 would need to be established. As the NLA Name Authority File reflects a less homogeneous collection than average it would seem reasonable to increase the number of entries expected to be in the file from 57 to 81 (approx 60%). This will mean that 55 entries would need to be created for every 100 titles catalogued giving a title to authority entry ratio of 55%.

D.3. MAGNETIC TAPE VOLUMES

D.3.1 The libraries requiring magnetic tape output will be able to receive catalogue records, catalogue correction records and authority file correction records.

D.3.2 Constant elements:

a) Catalogue record correction factor (as in D.2.2 (c))

b) Authority file record correction factor (as in D.2.2 (d)) (5%)

c) Average no. of characters per catalogue record. (500)

d) Average no. of characters per authority correction record. (80)

D.3.3 Variable elements:

a) Average no. of titles catalogued per annum.

D.3.4 Computation model
3A + (2A x 3A) + (2B x 3A)

D.3.5 This total may be expressed in number of characters rather than number of records by the use of D.3.2 (c) and D.3.2 (d).

D.3.6 Derived constant. A constant may be derived from the table given at Attachment 1 to allow extrapolation to various volumes of traffic, viz that the number of off-line machine-readable records to be produced for the average mix of library participants will be .363 times the number of titles per annum catalogued by those libraries, and that the number of characters produced will be 180 times the number of titles.

D.4. ON-LINE RECORD DELIVERY VOLUMES

D.4.1 As above for magnetic tape output. An allowance could be made for line-transmission overheads (50 chars/rec).

D.4.2 Derived constant. Number of records is .061 times the number of titles, number of characters is 32.4 times the number of titles.

NOTE:- The final 'mix' of card users as against magnetic tape users and on-line users is not easy to predict at this early stage. The responses to the BIBDATA Survey were used (with some interpretation) to arrive at the above mix.

D.5. LINE-PRINTER OUTPUT - STANDARD STATIONERY

D.5.1 Five standard stationery output products are listed in the BIBDATA System Specification.

D.5.2 Constant elements:

a) Number of lines per listing (20 lines per listing for listings 4 & 5)

b) Number of listings per annum (12).

D.5.3 Computational model. As the first three listings are expected to be used only by the BIBDATA Control Section their output volume by be expressed as 2A x 2B. For a system servicing 20 libraries the volumes for these three listings are estimated at 225,350 and 20,000 lines per month respectively. Increase in the number of libraries will increase this volume close to linearly. The other two listings will be expressed as 2A x 2B x 2C. Total volume will be the sum of the totals for each listing.

D.5.4 The constant to be used here is expressed in terms of the number of lines printed per year per library on the

system - 15000. This can be extrapolated to a figure of 855,000 lines per year for the 57 libraries who responded to the BIBDATA Survey.

D.6. SCREEN OUTPUT VOLUMES

D.6.1 This section is based on the screens described in the hypothetical model given in Appendix C of the Specification. Explanations of the derivation of values for the elements below are given in Attachment 2 to this paper.

D.6.2 Constant elements

a) No. of characters transmitted per copy cataloguing transaction (9427)

b) Percentage of copy cataloguing transactions expected (90%)

c) Number of characters transmitted per original cataloguing transaction (15,988).

d) Percentage of original cataloguing transactions expected (10%)

e) No. of characters transmitted for the unsuccessful bibliographic searches preceeding original cataloguing (8920)

f) No. of characters transmitted per inter-library loan transaction (4224)

g) No. of general bibliographic verification screens as a percent constant of titles catalogued (25%)

h) No. of characters transmitted per general verification action (4224)

D.6.3 Variable elements:

a) No. of titles catalogued per annum for each library

b) No. of cataloguing transactions per annum for each library

(assumed to be titles catalogued plus 10-50% of the number of duplicates depending on the type of library)

c) No. of inter-library loan transactions per annum for each library.

D.6.4 Computational model

(2A x 2B x 3B)+(2C x 2D x 3A)+(2D x 2E x 3A)+(2F x 3C)+
(2G x 2H x 3A)

D.6.5 Derived constant. Number of transmitted characters per year is 15,007 times the number of titles catalogued per year. This was derived by dividing the number of characters transmitted per year for the 20 libraries in the sample by the number of titles catalogued by these libraries. For the 57 libraries answering the BIBDATA survey, for instance, with a total annual intake of 877,200 titles, this would produce an expected character transmission rate of 13,164,140,000 chars per annum.

D.7. ARCHIVE OUTPUT

D.7.1 Consistent with the concept of archiving outlined in the BIBDATA System Specification, archive output would most usefully be expressed in terms of the number of characters to be stored.

D.7.2 Constant elements:

a) Percentage of titles requiring change (30%).

b) Average no. of fields changed (3)

c) Average size of each field changed (in characters)(50).

D.7.3 Variable elements:

a) No. of titles catalogued per annum.

D.7.4 Computational model.

2A x 3A x 2B x 2C

D.7.5 Derived constant. Number of charaters stored is 45 times the number of titles catalogued per annum. For the 57 libraries answering the BIBDATA Survey, for instance, this would produce an expected storage requirement of 39,472,296 characters per annum.

ATTACHMENT 1

OUTPUT VOLUME ESTIMATES

SAMPLE LIBRARY	TITLES CAT. p.a.	DUPLICATE TITLES RECD. p.a. *	TOTAL CARD VOL p.a.	LINES PRINTED FOR CARDS 000's	OFF-LINE RECORD DELIVERY p.a.	ON-LINE RECORD DELIVERY p.a.	LINES PRINTED p.a.	LOCATION REQUESTS p.a. **	SCREEN TRANS. 000 's chars	No. of CHARS. ARCHIVED p.a.
1	20,000	10,000	171,940	1,916	-	-	480	180	258,348	900,000
2	50,000	30,000	447,040	4,790	-	-	480	600	629,486	2,250,000
3	27,000	143,000	680,870	2,587	-	-	480	1,250	457,377	1,215,000
4	26,000	8,000	-	-	28,600		480	21,000	426,962	1,170,000
5	9,000	1,000	65,340	862	-	-	480	8,000	146,313	405,000
6	40,000	40,000	-	-	44,000		480	51,000	781,504	1,800,000
7	20,000	5,000	-	-	-	22,000	480	16,500	327,284	900,000
8	16,000	6,000	-	-	17,600		480	2,100	298,168	720,000
9	23,000	7,000	182,250	2,203			480	6,000	327,509	1,035,000
10	21,000	4,000	158,180	2,012	-	-	480	1,500	275,955	945,000
11	8,250	4,000	-	-	9,075		480	400	117,913	371,250
12	24,000	6,000	256,150	2,300	-	-	480	1,000	318,420	1,080,000
13	7,000	6,000	68,780	670	-	-	480	250	98,000	315,000
14	10,000	3,000	72,450	958	-	-	480	2,400	138,932	450,000
15	4,000	4,000	41,260	383	-	-	480	60	56,861	180,000
16	12,000	3,000	92,850	1,150	-	-	480	50	153,067	540,000
17	6,000	1,000	44,700	575	-	-	480	2,500	85,291	270,000
18	20,000	3,000	-	-	22,000		480	2,500	259,664	900,000
19	6,500	1,000	47,560	623	-	-	480	200	81,591	292,500
20	8,000	12,000	-	-	8,800		480	5,000	130,094	360,000
TOTALS	357,750		2,329,480	21,029	130,075	22,000	9,600	123,490	5,368,739	16,098,000

* The figures given here are copies received which duplicate titles already held

** Location figures are based on 3 times those supplied through the survey. This is to allow for expansion due to ease of use of the system.

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ATTACHMENT 2

EXPLANATION OF CONSTANT VALUES IN D.6.2

D.6.2. a)

TYPICAL COPY CATALOGUING ACTIONS

Screens used (I = input O = output)	No. of chs/screen	Percentage of times this screen is used	Derived no. of characters in an average transaction
1. Request Function Select Screen (I)	132	100	132
2. Function Select screen displayed (O)	1652	100	1652
3. Request a record by supplying input criteria (I)	132	100	132
4. Function Select screen returned with 'Zero retrievals' (O)	1652	50	826
5. Request via other input criteria (I)	132	55	72
6. Catalog Display Screen 1 returned with multiple retrievals (O)	692	20	138
7. Request correct item (I)	132	20	26
8. Catalog Display screen 2 returned with 1 record (O)	1252	100	1252

9. Request message Screen (I)	132	5	7
10. Message screen returned (0)	772	5	39
11. Message sent (I) (report biblio error etc)	292	5	15
12.Hold Screen (Cat. Disp. 2) returned (0)	1252	5	62
13. Acknowledgement (0)	1012	5	50
14. Request Authority File Screen (I)	132	100	132
15. Authority file screen returned (0)	1852	100	1852
16. Request error Report Screen (I)	132	5	7
17. Error Rept. Screen returned (0)	692	5	35
18. Fill & submit Error Rept. Screen (I)	372	5	18
19. Hold Screen (Cat Display 2) returned (0)	1252	5	62
20. Acknowledgement (0)	932	5	47
21. Request Addition Screen (I)	132	5	7
22. Addition Screen returned (o)	692	5	35

23. Fill & submit Addition Screeen (I)	372	5		18
24. Hold Screen (Cat. Display 2) returned	1252	5		62
25. Acknowledgment (0)	932	5		47
26. Request Archive revision on Catalog Display 2 (I)	132	15		20
27. Archive version returned (0)	1412	15		211
28. Edit item & request output (I)	1412	130		1835
29. Catalog Display 2 returned with error messages (O)	1412	15		212
30. Correct errors & request output (I)	1412	15		212
31. Record accepted & user notified	212	100		212
			TOTAL	9427

D.6.2 b)

Copy cataloguing rate of all libraries from national agency records is assumed to reach to same level as currently reached by NLA - approx 80%. Of the remaining 20%, assuming an average duplication of locations of 3, the shared cataloguing component should contribute an added 14% of copy cataloguing. Allowing a margin for skewed distribution at this end of the scale the assumption has been made of 90% copy cataloguing to 10% original cataloguing for the average library.

D.6.2 c)

TYPICAL ORIGINAL CATALOGUING TRANSACTION

Screens used	No. of chs/screen	Percentage of times this screen is used	Derived no. of chs. in an average transaction
1. Request Function Select Screen (I)	132	100	132
2. Function Select Screen displayed (0)	1652	100	1652
3. Request Input Worksheet Screen (I)	132	100	132
4. Input Worksheet Screen displayed (0)	612	100	612
5. Access Authority File Screens (I)	132	300	396
6. Authority File Screens returned (0)	1852	300	5556
7. Request Authority File Error Rept. screen (I)	132	15	20
8. Error Screen returned (0)	692	15	104
9. Error Screen filled & submitted (I)	372	15	56
10. Acknowledgement (0)	932	15	140
11. Request Authority File Addition Screen (I)	132	15	20
12. Authority File Addition Screen returned (0)	692	15	104
13. Addition Screen filled & submitted			

filled & submitted (I)	372	15	56
14. Acknowledge-ment (0)	932	15	140
15. Request held (Worksheet) screen (I)	132	300	396
16. Held screen returned (0)	1252	300	3756
17. Submit, & request output (I)	1252	100	1252
18. Worksheet screen returned with error messages (0)	1252	50	626
19. Worksheet corrected and re-submitted (I)	1252	50	626
20. Record accepted & user notified (0)	212	100	212
		TOTAL	15988

6.2 e)

TYPICAL UNSUCCESSFUL BIBLIO SEARCH ACTION

Screens used	No. of chs/screen	Percentages of times this screen is used	Derived No. of chs in an average transaction
1. Request Function Select Screen (I)	132	100	132
2. Function Select screen displayed (0)	1652	100	1652
3. Request a record by supplying input criteria (I)	132	400	528
4. Function Select screen returned with 'Zero retrievals' (0)	1652	400	6608
		TOTAL	8920

6.2 f)

TYPICAL INTER-LIBRARY LOAN ACTIONS

Screens used	No. of chs/screen	Percentage of times this screen is used	Derived no. of chs in an average transaction
1. Request Function Select Screen (I)	132	100	132
2. Function Select Screen displayed (0)	1652	100	1652
3. Request a record by supplying input criteria (I)	132	150	198
4. Function Select Screen retrieved with 'Zero retrievals'	1652	50	826
5. Catalog Display 1 returned (0)	692	20	138
6. Request correct item (I)	132	20	26
7. Catalog Display Screen 2 returned with 1 record (0)	1252	100	1252
		TOTALS	4224

6.2 g)

BIBLIOGRAPHIC VERIFICATION ACTIONS

This constant allows for bibliographic search for acquisitions checking and for other miscellaneous requirements. A component of 25% of titles catalogued was estimated.

6.2 h)

As the above verification action will, in fact, involve the same screens as will an inter-library loan querying action, the same character loading has been allowed as for 6.2 f) above.

APPENDIX E - DATA BASE SIZE ESTIMATES

E.1 High speed random access storage will be required for a number of elements in the BIBDATA system. The bulk of this storage will be required for:-

- Bibliographic data base;
- Data base indexes;
- Authority files;
- System output queues;
- System requirements for:
  - Systems supervisor;
  - Systems library;
  - Applications programs;
  - System tables;
  - Other work areas;
- Locally edited data and call number information;
- Location data.

The following details relating to the particular requirements of each element are based on the assumption that phase 1 of the system will be in operation for the first five years.

E.2 Storage Requirements for the Bibliographic Data Base.

It has been stated in the Appendices that the initial data base will contain some 1.4 million records. This basic data will require 700 million characters of direct access space. A summary of the data base size including growth over a five year period is contained in Table E2. Culling of the data base will take place. However the basis for this culling operation has yet to be finalised and consequently no allowance for a reduction in data base size has been made in the estimates.

E.3 Data Base Indexes.

In phase 1 of the implementation schedule it is anticipated that the following access points to the main data base will

be provided:-

- ISBN;
- BIBDATA Control Number;
- BNB Control Number;
- AUSMARC Control Number;
- Canadiana Control Number;
- Truncated Author/Title key.

Other access points may be provided if the software package selected supports them. An example in this category is the access point by author. However it is possible that that such additional access points may not be available until phase 2. The estimates in Table E2 indicate the number of characters and total storage required for each access point included in the list above.

E.4 In assessing the total storage required the basic assumption that index blocks will be 3000 characters in size has been made. The storage has then been calculated by assessing how many storage blocks of this size will be required in a hierarchical structure to access an individual member of that set of access points. A further basic assumption is that blocks in the index will only be filled to 60% of their capacity. This has been done to cater for overflow.

TABLE E1

ACCESS POINT INDEX SPACE REQUIREMENTS

(Disregarding higher level indexes)

INDEX TYPE	No. Chars	No. of initial access points
ISBN	15	1,149,000
BIBDATA Number	9	1,395,000
LC Card Number	15	1,021,000
BNB Control No.	13	298,000
AUSMARC	13	50,000
Canadiana	15	36,000

Trunc Author/Title 15 1,395,000

E.5 Storage Requirements for Authority Files

Authority files are assumed to be created on the basis of usage rather than being created during the data base load operation. It is further assumed that each entry will require an average of 55 characters of storage. Library of Congress Subject Headings will be available as a reference tool with no write capability by other than the central site operations staff. The storage needs for Authority files has been included in Table E2.

E.6 Storage Requirements for System Output Queues

The storage required to hold output records prior to printing or dispatch on magnetic media will be dependant on the frequency of output, i.e daily,weekly etc. For an annual cataloguing throughput of 1 million items the weekly load would be 20,000 records representing some 10 million characters of storage. It has been assumed that at least weekly outputs will be required and the estimate is based on this premise.

E.7 Storage Requirements for System Functions.

The storage allocation for general systems operation will in the main be dictated by the installation and the operating system under which BIBDATA operates. An allowance of 100 million characters of direct access storage has been included in these estimates for system purposes. This should be adequate to satisfy system needs.

E.8 Storage Requirements for Local Editing and Call Number Data.

It is proposed that local editing will form the basis of the archive data to be held on line. It has been estimated in Appendix B that 25% of all records retrieved will be amended by an average of 20 characters. In addition there will be call number data entered. This has been estimated at 28 characters per record.

E.9 Storage Requirements for Location Information

Storage estimates for location data has been based on 8 characters for each record retrieved plus 8 characters per record for direct NUCOM entered items.

APPENDIX E DATA BASE DIRECT ACCESS STORAGE ESTIMATES

DIRECT ACCESS STORAGE ESTIMATES

Data Base Elements	Initial No. Recs	1979 Recs 000's	1979 Chars mills	1980 Recs 000's	1980 Chars mills	1981 Recs 000's	1981 Chars mills	1982 Recs 000's	1982 Chars mills	1983 Recs 000's	1983 Chars mills
Bibliographic Data base											
LC	1,021,000	1138	569.0	1259	629.5	1383	691.5	1511	755.5	1643	821.5
BNB	288,000	331	165.5	376	188.0	423	211.5	473	236.5	525	262.5
AUSMARC	50,000	62	31.0	76	38.0	92	46.0	110	55.0	130	65.0
CANADA	36,000	51	25.5	68	34.0	87	43.5	108	54.0	131	65.5
Original entry	-	15	7.5	135	67.5	261	130.5	383	196.5	493	246.5
Data Base Indexes											
ISBN	1,149,000	1312	33.0	1586	39.9	1860	46.8	2140	53.9	2419	60.6
BIBDATA No.	1,395,000	1597	24.1	1914	28.8	2246	33.8	2585	38.9	2922	44.0
LC Card No.	1,021,000	1138	28.7	1259	31.7	1383	34.7	1511	38.1	1643	41.3
BNB No.	288,000	331	7.2	376	8.2	423	9.2	473	10.2	525	11.5
AUSMARC No.	50,000	62	1.3	76	1.6	92	2.1	110	2.4	130	2.7
CANADA	36,000	51	1.2	68	1.5	87	2.1	108	2.4	131	2.7
Trunc. Key	1,395,000	1597	40.1	1914	48.1	2246	56.4	2585	64.9	2922	73.3
Authority File											
Name and Series	-	113	6.2	176	9.7	266	14.6	356	19.6	446	24.5
LCSH	520,000	560	14.0	600	15.0	640	16.0	680	17.0	720	18.0
Output Queues	-	-	10.0	-	10.0	-	10.0	-	10.0	-	10.0
System	-	-	100.0	-	100.0	-	100.0	-	100.0	-	100.0
Edit data	-	15	0.3	185	3.7	378	7.6	603	12.1	850	17.0
Call Number	-	75	2.1	875	24.5	1775	49.7	2796	78.3	3896	109.1
Location data	-	75	0.6	875	7.0	1937	15.5	3286	16.3	4888	29.1
Local Field data	-	60	1.8	740	22.2	1514	45.4	2414	72.6	3404	102.3
TOTAL			1069.1		1308.9		1566.9		1834.2		2107.1

APPENDIX F - TELECOMMUNICATIONS LINE REQUIREMENTS

TABLE F1

TELECOMMUNICATIONS LOADINGS

ESTIMATED AVERAGE LINE LOADINGS

(millions of characters per hour)

STATE	1979	1980	1981	1982	1983
QLD	-	1.202	1.525	1.989	2.188
NSW	-	2.190	3.064	3.728	4.101
ACT	1.055	2.043	2.247	2.472	2.719
VIC	-	1.999	3.428	4.207	4.628
TAS	-	0.442	0.486	0.535	0.588
SA	-	0.413	0.749	0.824	0.906
WA	-	-	0.804	1.132	1.493
TOTAL	1.055	8.289	12.303	14.887	16.623

TABLE F2

ESTIMATED NUMBER OF HIGH SPEED LINES REQUIRED

(9600bps with 4800bps in parenthesis)

LINK	1979	1980	1981	1982	1983
QLD - ACT	-	1 (1)	1 (2)	1 (2)	1 (2)
NSW - ACT	-	1 (2)	2 (3)	2 (3)	2 (4)
TAS - VIC	-	1 (1)	1 (1)	1 (1)	1 (1)
VIC - ACT	-	1 (2)	2 (3)	2 (4)	2 (4)
WA - SA	-	-	1 (1)	1 (1)	1 (2)
SA - ACT	-	1 (1)	1 (2)	1 (2)	1 (2)
TOTAL	-	5 (7)	8 (12)	8 (13)	8 (15)

TABLE F3

ESTIMATED NUMBER OF TERMINALS REQUIRED

STATE	1979	1980	1981	1982	1983
QLD	-	14	18	22	23
NSW	-	26	35	41	43
ACT	5	16	20	21	22
VIC	-	21	39	45	48
TAS	-	6	6	6	7
SA	-	6	11	12	13
WA	-	-	9	11	14
TOTAL	5	89	138	158	170

APPENDIX G CATALOGUING COSTS AT THE NATIONAL LIBRARY OF AUSTRALIA USING CURRENT MANUAL METHODS

COPY CATALOGUING USING LIBRARY OF CONGRESS CARDS

	Processing time (min)	Level	Salary	Unit Cost $
Initial sorting	0.3	CA3,4	6803	0.02
LCC file search	4.0	CA3	6578	0.27
LCC/book match Reproduction of 3 cards for edit	2.3	CA3	6578	0.16
Precataloguing	15.0	CA3,4	6803	1.05
Editing	12.0	CA5	7679	0.95
Postcataloguing -				
shelflisting	6.5	CA2	5991	0.40
authority files	7.8	CA2	5991	0.48
card ordering	2.0	CA2	5991	0.12
Card production	5.0+	CA1	5603	0.29
Typing and checking	2.4	T1	5890	0.15
Filing	12.0	CA1,3	6090	0.75
TOTAL				4.64

ORIGINAL CATALOGUING

Initial sorting	0.3	CA3,3	6803	0.02
LCC file search	4.0	CA3	6578	0.27
Precataloguing	15	CA3,4	6803	1.05
Cataloguing	44.0	L1	10100	4.58
Postcataloguing -				
shelflisting	6.5	CA2	5991	0.40
authority files	7.8	CA2	5991	0.48
card ordering	2.0	CA2	5991	0.12
Card production	5.0+	CA1	5603	0.29
Typing and checking	11.7	T1	5890	0.71
Filing	12.0	CA1,3	6090	0.75
TOTAL				8.67

APPENDIX H BIBDATA QUESTIONNAIRE

H.1 As part of this study a questionnaire was sent to a number of institutions seeking basic information as input to the study. This information covered such topics as current and projected cataloguing throughputs, the volume of inter-library loan requests, cataloguing costs and some indication of future plans relating to catalogue development.

H.2 Questionnaires were sent to the following institutions:-

C.S.I.R.O.
Dept. of Defence

State Librarians

State Library of New South Wales
State Library of South Australia
State Library of Tasmania
Library Council of Victoria
Library Board of Western Australia
State Library of Queensland

Parliamentary Librarians

Commonwealth Parliamentary Library, Canberra A.C.T.
State Parliamentary Library, Sydney NSW
State Parliamentary Library, Brisbane Qld
State Parliamentary Library, Adelaide S.A.
State Parliamentary Library, Hobart Tas
State Parliamentary Library, Melbourne Vic
State Parliamentary Library, Perth W.A.

University Librarians at:-

Australian National University
University of Sydney
University of New South Wales
University of New England
Macquarie University
University of Newcastle
University of Wollongong
University of Queensland
James Cook University of North Queensland
Griffith University
University of Adelaide
Flinders University of South Australia
University of Tasmania
University of Melbourne
Monash University
La Trobe University
University of Western Australia

Murdoch University

Colleges of Advanced Education and Institutes of Technology at:-

Canberra College of Advanced Education
Armidale College of Advanced Education
Goulburn College of Advanced Education
Kuring-gai College of Advanced Education
Mitchell College of Advanced Education
Nepean College of Advanced Education
Northern Rivers College of Advanced Education
Riverina College of Advanced Education
Capricornia College of Advanced Education
North Brisbane College of Advanced Education
Kelvin Grove College of Advanced Education
Adelaide College of Advanced Education
Murray Park College of Advanced Education
Torrens College of Advanced Education
Tasmanian College of Advanced Education
Ballarat Institute of Advanced Education
Gippsland Institute of Advanced Education
Prahran College of Advanced Education
State College of Victoria
The N.S.W Institute of Technology
Darling Down Institute of Advanced Education
Queensland Institute of Technology
South Australian Institute of Technology
Tasmanian college of Advanced Education
Bendigo Institute of Technology
Caulfield Institute of Technology
Gordon Institute of Technology
Royal Melbourne Institute of Technology
Education Resource Centre S.C.V. at Melbourne
Swinburne College of Technology
Warrnambool institute of Advanced Education
Western Australian Institute of Technology

Canberra Public Library Service
Bankstown Municipal Library
City of Sydney Public Library
Newcastle Public Library
Upper Murray Regional Library
City of Greater Wollongong Public Library
Brisbane Municipal Library Administrator
Clarence Municipal Library Services
Altona City Library
MINTERLIB
TECHNILIB
Sydney Chief Librarians Committee
Australian Bureau of Statistics

H.3 A sample of the questionnaire is included as Attachment 1.

Attachment 1.

National Library of Australia

ref. 500/1/25
date:

Canberra ACT 2600 Telephone 621111
Telegraphic Code Address: Natlibaust Canberra
Telex Code No. 62100

Dear

National On-Line Shared Cataloguing System

The National Library is currently engaged in investigating a national on-line shared cataloguing system. An important objective of the system will be to curb the rising costs of bibliographic processing.

In broad outline, the proposed system will provide a machine-readable database of bibliographic information derived from Australian and other national MARC tapes together with original input by Australian libraries. Libraries with access to the database will be able to enter original cataloguing data, edit derived cataloguing data, verify bibliographic data, determine the location in Australia of titles in the file, and obtain a variety of appropriate output products. The full range of these services will be introduced in a series of stages over a number of years. In the first stage it is proposed to deal only with monographs.

Current investigations centre around the economic feasibility and technical practicabilities of a national on-line shared cataloguing system and considerable effort has already been expended by the National Library on this task. Your organisation has been included in a representative sample of libraries which are being requested to complete the attached questionnaire. The purpose of the questionnaire is to obtain certain data necessary in the preparation of a preliminary specification which will subsequently be discussed with the Australian library community possibly at a one-day meeting similar to the Australian MARC Forum held in 1974. I would be grateful

if you could return the completed questionnaire as soon as possible and preferably by mid-December 1975.

The questions are designed to assist us in deriving fair estimates of the loads that would be placed on such a system. In addition, we hope to gain a clear impression of the physical output that might be expected and to what extent existing or planned computing facilities could be utilised.

Yours sincerely,

Arthur Ellis
ASSISTANT DIRECTOR-GENERAL
(Networks and Co-Ordination)

NATIONAL LIBRARY OF AUSTRALIA

NATIONAL SHARED CATALOGUING SYSTEM (Survey B.1)

Questions relating to the completion of the questionnaire may be made by telephoning the Senior Project Officer, National Shared Cataloguing System, Mr John Gillam, on Canberra 621111 extension 547.

1 Name and address of your institution

2 Liaison officer for this survey within your institution

Officer's name: .....

Position held: .....

Telephone No.: .....

3 Are you answering this questionnaire with figures for financial or calendar years?

FINANCIAL	CALENDAR

4 What are the known or projected number or monograph titles added for the following periods?

Latest available full Year Figures (Year .....)	Projections for Year 1976 or 76/77	Projections for Year 1978 or 78/79	Projections for Year 1980 or 80/81

5 What are the known or projected number of accessions of monograph holdings (volumes) added for the following periods?

Latest available full Year Figures (Year .....)	Projections for Year 1976 or 76/77	Projections for Year 1978 or 78/79	Projections for Year 1980 or 80/81

6 Estimate the current backlog (if any) of monograph titles to be catalogued.

Titles

Is this a temporary or continuing situation?

Temporary	Continuing

7 **What percentage of copy cataloguing is undertaken in your library?**

	%

Sources of data:

- ☐ ANB
- ☐ BNB
- ☐ Australian cards
- ☐ BNB cards
- ☐ LC cards
- ☐ NUC
- ☐ Other (please specify .....)

(Indicate sources with an 'X' in the appropriate boxes)

---

8 **What percentage of your total monograph titles cataloguing is represented by non-Roman script?**

	%

---

9 **How many inter-library loan requests for monographs, satisfied and unsatisfied, did your library make during the last full year for which figures are available?** (Estimates are adequate if detailed figures are not available).

Year	
Total satisfied	Combined total
Total unsatisfied	

---

10 **What is the estimated unit cost in your library of cataloguing a monograph title exclusive of purchase price and overheads?**

$	

---

11 Do you currently utilise any form of ADP facilities or services?

YES	NO

If YES, please give brief details. (If there is insufficient space, please attach details on a separate sheet).

1 .....

2 .....

3 .....

4 .....

5 .....

---

12 Do you intend to make use of ADP services or facilities in the next five years?

YES	NO

If YES, please give brief details and anticipated date of introduction. (If there is insufficient space, please attach details on a separate sheet).

1 .....

2 .....

3 .....

4 .....

5 .....

---

13 What is the physical format of your present catalogue?

If you anticipate changing the format in the coming years, please indicate the anticipated format:

APPENDIX I TERMINAL CONSIDERATIONS

I.1 A detailed specification of terminals to be used on the BIBDATA system will be drafted in consultation with participants. The specification derived should be as flexible as possible in order to allow potential users to take advantage of any terminal devices they currently have available. However there are a number of characteristics that must of necessity be part of any device in order to connect that device to the proposed network.

I.2 The type of data to be handled by the system will be one of the most important determinants of the essential characteristics. To adequately display the information being transmitted, the terminal should be capable of:

- displaying upper and lower case characters and

- displaying an extended character set (probably that endorsed by the ALA)

I.3 A further essential characteristic is that the terminal should be compatible with any communications protocols laid down by the common carrier, in this case the Australian Telecommunications Commission. As the tendency is for Australian standards to follow those laid down by the International Standards Organisation (ISO) the range of terminal makes covered by the specification should be quite extensive.

I.4 The specification whilst recognising the need to cater for existing terminal equipment already in use, will in essence address itself to those properties essential and/or desirable in any new equipment being considered. The two primary areas to be considered in this regard are:-

a) performance characteristics necessary to optimally utilise the system

b) user needs in terms of terminal design, physical appearance, ease of use etc.

Those properties allied to point (a) will largely be determined by the characteristics of the BIBDATA system and its ancillary communications network.Some of the points that will have to be considered however are:-

- character sets available

- a standard key-board

- variable transmission speed settings

- programmable function keys

- data field protection

- extensive editing facilities

- flexible screen cursor positioning for CRT's

I.5 From the user viewpoint, screen presentation, ease of use and speed of reply are the properties most important in terminal operation. The speed factor will largely be a function of the system performance. However the terminal must also reflect the speed of the system and in this regard CRT displays are preferable to hardcopy units. Other desirable features are:-

- a variety of display options e.g. flashing fields, white on black, black on white;

- ability to scroll the terminal memory i.e. move backward and forward

I.6 There are a number of specifications of terminals for on-line library systems already in existence e.g. OCLC, BALLOTS. There are also a number of more general specifications e.g. an Australian Public Service Board specification. These are all of value in drafting a BIBDATA terminal specification. It should however reflect the needs of the BIBDATA system not those of systems which are in some way or other different.

I.7 A further factor to be considered is that of advancing technology which is fostering the development of more sophisticated terminal equipment than was available when some of the specifications mentioned above were prepared. The BIBDATA specification should reflect all known advances. Terminals are now available with in-built storage facilities such as cassette tapes and indications are that stand-alone terminals with some programmable logic capability (intelligent terminals) will be available shortly at relatively cheap cost.

APPENDIX J - CHARACTER SET

J.1 The character set to be available with the initial system is restricted to the standard MARC set. However the software chosen must be capable of extension to handle other character sets and also mathematical notation. These extensions will be necessary in the long term.

J.2 The character set required in the initial system is :-

!	exclamation mark	"	opening quote
$	dollar	%	percent
&	ampersand	'	apostrophe
(	opening parenthesis	)	closing parenthesis
*	asterisk	+	plus
,	comma	-	hyphen/minus
.	full stop	/	slash
0		1	
2		3	
4		5	
6		7	
8		9	
:	colon	;	semi colon
<	less than	=	equals
>	greater than	?	question mark
@	at sign	A	
B		C	
D		E	
F		G	
H		I	
J		K	
L		M	
N		O	
P		Q	
R		S	
T		U	
V		W	
X		Y	
Z		[	opening square bracket
]	closing square bracket	a	
b		c	
d		e	
f		g	
h		i	
j		k	
l		m	
n		o	
p		q	
r		s	
t		u	
v		w	
x		y	
z		£	pound sign

grave
circumflex
macron
umlaut
cedilla
double dagger
Polish 1 - upper case
d with crossbar - uppercase
AE uppercase
miagkiy znak
musical flat
plus/minus
ayn
Scandanavian o - lowercase
Icelandic thorn - lowercase
Turkish i lower case
hacek
ligature 1
high comma diacritical
candrabindu
dot below character
circle below character
left hook
upadhmaniya
alpha
gamma
upper case hook O
lower case hook o
double tilde 2

acute
tilde
breve
degree
underscore
reverse slash
Scandanavian o with slash
Icelandic Thorn - uppercase
OE uppercase
dot in middle of line
subscript patent mark
alif
Polish 1 - lowercase
d with crossbar - lowercase
tverdyi znak
superior dot
angstrom
ligature 2
double acute
right hook
double dot below character
double underscore
right cedilla
double tilde 1
beta
eth
upper case hook U
lower case hook u
high comma - centered

APPENDIX K - EVALUATION CRITERIA

K.1 The evaluation criteria set out in this appendix are to be applied to all software packages which prima facie meet the stated system requirements. Each item in the list has been allocated a point value according to its relative importance. The higher the value scored, in total, the more acceptable is the package. This approach can lead to acceptance of a package which is ideal in the majority of respects but deficient in one critical area. Therefore the criteria have deen divided into a number of sections. Each section has been allocated a minimum acceptable score. To be eligible for final consideration a package must meet the minimum standard score in all sections. This method of package evaluation will only isolate those packages which are suitable for deeper examination.

K.2 There are five basic areas of interest. These are:-

- bibliographic capability;
- Data base management system capability;
- General system capability;
- Availability;
- Cost.

K.3 The minimum score considered acceptable for each of these sections are:-

Bibliographic	50	max 100
DBMS	50	max 100
General	50	max 100
Availability	25	max 50
Cost	25	max 50

EVALUATION CRITERIA	MAXIMUM RATING
1.0 BIBLIOGRAPHIC	
1.1 Authority files	6
1.2 Local input capability	6
1.3 Multi library capability	6
1.4 Archive capability	5
1.5 Access by;	
ISBN	5
Other control numbers	5
Author / title	4
Author	3
Title keyword	2
Subject	3
Classification	2
Series	2
1.6 Output of:	
Catalogue cards	5
Microform	2
MARC records on magnetic media	5
Acquisitions listings	2
Authority file cards for author, series and subject	3
Physical item identifiers	1
Book catalogues	1
Photocomposition magnetic tapes	1
Usage statistics	3
1.7 Inter Library Loan records	2
1.8 Acquisitions	
Purchase orders	1
Claims	1
Accounting	1
Receiving	1
Invoice clearance	1
Cancelling	1
Vendor file maintenance	1
Production statistics	1
1.9 Serials	
Lacunae lists	1
Binding	1
Claiming	1
Purchase orders	1
Check in	1
Invoice clearance	1
Routing	1
Production statistics	1
1.10 Circulation	
Overdue notices	1
Recall notices	1
Reserve book notices	1
High usage alert	1

maps	2
reports	2
3.2 Ease of modification:	
modular structure	5
telecommunications protocols	5
completeness of documentation	6
3.3 Other support	
training package	5
debug package	4
3.4 Flexibility of system	5
3.5 Multilingual capability	3
3.6 Human engineering aspects	5
3.7 Ability to handle IRS	2
3.8 Proprietary software	3
3.9 Degree of software support	6
3.10 Programming language	5
3.11 Character set availability	5
3.12 Ability to accept MARC records	6
3.13 Ability to output MARC records	6
3.14 Ability to detect and process duplicate keys	3
3.15 Production of system utilisation statistics for each user and the system as a whole	3
3.16 Ability to produce statistics relating to data base content in a tabular form	1
3.17 Sorting capability	4

4.0 AVAILIBILITY

4.1 Availability of proven software	15
4.2 Availability of technical consultants for:	
applications programs	10
communications software	5
DBMS and system software	10
4.3 Ownership rights	10

5.0 COSTS

5.1 Software cost - applications software	5
5.2 Software cost - system software	5
5.3 Hardware cost	5
5.4 Site preparation cost	5
5.5 Modification cost	10

Check out	1
Check in	1
Renewals	1
Reserve	1
User stop list	1
Statistics	1

2.0 DATA BASE MANAGEMENT SYSTEM

2.1 in on-line mode: provide pre-search statistics during multi-key searches	2
backward scan capability	5
inversion on algorithm supplied keys	10
2.2 On-line updating	10
2.3 Ability to handle data bases in excess of 2 million records	10
2.4 Ability to handle variable length data (max field length 999 characters)	6
2.5 Ability to handle up to 60 fields in a record	7
2.6 Ability to handle multiple data bases	3
2.7 Data integrity and restart provisions	10
2.8 Suitability of data base structure	10
2.9 Hardware independence	4
2.10 Data security (passwords, multi level access authority etc)	4
2.11 Retrieval performance	10
2.12 Degree of data independence in relation to data base organisation versus applications programs	4
2.13 Versatility of data base handler as it relates to addition of new fields and logical relationships without reloading the data base.	5

3.0 GENERAL SYSTEM CAPABILITY

3.1 Ability to handle unique fields and edits for:	
monographs	5
serials	4
newspapers	1
manuscripts	1
audio visual	3

5.6 Operational costs:

Communications cost	10
maintenance cost	10

APPENDIX L APPROXIMATE COST QUANTIFICATION FOR FOUR ALTERNATIVE APPROACHES TO CONFIGURATION OF THE COMPUTER NETWORK

ALTERNATIVE 1 Replication of the full data base at all regional sites.

ESTIMATED COST OF HARDWARE

Based on a DEC System 1080

This is not an expression of equipment preference but is representative of the machine size required to operate a regional site of this type.

Minimum configuration consisting of CPU, Memory module, Data Channel, Controller Line printers, Communications equipment, and Tape units	$660,000
2000 megabytes of disk storage	$400,000
Site preparation	$ 50,000
	$1,110,000

Seven of these sites would be required, one in each state capital plus one in the A.C.T. This assumes a distributed data base with each site interlinked.

OPERATING COST PER SITE PER ANNUM

STAFF - site manager/software programmer, six operators (three per shift) and one clerical staff		$81,000
CONSUMABLES		
Paper and card stock	$6,000	
Magnetic Media	$1,000	
Cleaning	$8,000	
Power	$5,000	
COM	$2,000	
Rental - 1500 square metres at $20 per square metre per annum	$30,000	$52,000
TOTAL OPERATING COST PER SITE PER ANNUM		$133,000

COMMUNICATION COSTS

Assuming an interlinking of all regional sites the

telecommunications cost of a distributed data base would be approximately the same as a centralised system. It may be possible to reduce these costs slightly in a distributed system by means of the use of slower speed lines. For the purpose of this appendix a 10% reduction has been assumed. Thus line and modem charges for identical geographic coverage to that of a centralised system would be approximately $450,000 per annum.

LIAISON STAFF

There would be a need for a central staff of say ten people for liaison, administrative support and development purposes. This cost has been estimated at $120,000 per annum.

SUMMARY

Thus the total estimated cost of a decentralised data base operation is:-

CAPITAL COST $1,110,000 X 7	= $7,770,000
OPERATING COST $133,000 X 7 plus $120,000 for liaison staff	= $1,051,000
COMMUNICATION COSTS	= $ 450,000
AMORTISATION OF HARDWARE (10% fixed)	= $ 777,000

ALTERNATIVE 2 Replication of part of the data base at regional sites.

ESTIMATED COST OF HARDWARE

Based on a Data General Eclipse C300

CPU, memory module,channels, printers communications equipment, tape units	$170,000
700 megabytes of disk storage	$190,000
Site preparation	$ 50,000
	$410,000

Six of these sites would be required, one in each state capital, together with a central site for supply of first use records. The cost of the central site has been assumed at $800,000. It is also assumed that all regional sites are linked to the central site.

OPERATING COSTS PER SITE PER ANNUM

STAFF - two shift operation - as for a totally replicated data base site	$ 81,000
CONSUMABLES - as for a totally replicated data base site but with a 50% reduction in accommodation rental costs	$ 37,000
TOTAL OPERATING COSTS PER SITE PER ANNUM	$118,000
COMMUNICATION COSTS	$450,000
LIAISON STAFF - as for alternative 1	$120,000

SUMMARY

CAPITAL COST	$410,000 X 6	$2,460,000	
	$800,000 X 1	$ 800,000	$3,260,000
OPERATING COST	$118,000 X 7	$ 826,000	
	liaison staff	$ 120,000	$ 946,000
COMMUNICATION COSTS			$ 450,000
AMORTISATION OF HARDWARE (10% fixed)			$ 386,000

ALTERNATIVE 3 Distributed processing sites only

ESTIMATED COST OF HARDWARE

Based on a Data General Eclipse C300

CPU, memory module, channels, printers, tapes, communications equipment plus 200 megabytes of disk storage	$230,000
Site preparation	$ 50,000
	$280,000

Six sites will be required plus a central site. The central site cost is assumed at the cost of one fully replicated regional data base site ie. $1,110,000.

OPERATING COSTS PER SITE PER ANNUM

Staff - as for alternative 1	$ 81,000
Consumables - as for alternative 2	$ 37,000
TOTAL OPERATING COSTS PER SITE PER ANNUM	$118,000
COMMUNICATIONS COSTS	$450,000
LIAISON STAFF - as for alternative 1	$120,000

SUMMARY

CAPITAL COST $280,000 X 6	$1,680,000	
$1,110,000 X 1	$1,110,000	$2,790,000
OPERATING COSTS $118,000 X 7	$ 826,000	
liaison staff	$ 120,000	$ 946,000
COMMUNICATIONS COSTS		$ 450,000
AMORTISATION OF HARDWARE (10% fixed)		$ 279,000

ALTERNATIVE 4 Centralised data base with centralised processing

ESTIMATED COST OF HARDWARE

Based on IBM 370 equipment at the central site

CPU, memory, channels, communications equipment at the central site, printers, tape units		$2,935,000
3000 megabytes of disk storage		$ 400,000
Site preparation		$ 500,000
Concentrators	$180,000	
Concentraors site preparation	$ 50,000	$ 230,000
		$4,065,000

OPERATING COSTS PER ANNUM

STAFF	$ 388,000
CONSUMABLES	$ 150,000
TOTAL OPERATING EXPENSES	$ 538,000
COMMUNICATION COSTS	$ 500,000

SUMMARY

CAPITAL COSTS	$4,065,000
OPERATING COSTS	$ 538,000
COMMUNICATIONS COST	$ 500,000
AMORTISATION OF HARDWARE(10% fixed)	$ 406,500

COMPARISON OF APPROACHES ON COST GROUNDS

ALTERNATIVE	1	2	3	4
CAPITAL COST	$7,770,000	$3,260,000	$2,790,000	$4,065,000
OPERATING COSTS				
Staff and consumables	$1,051,000	$ 946,000	$ 946,000	$ 538,000
Communications	$ 450,000	$ 450,000	$ 450,000	$ 500,000
SUBTOTAL	$1,501,000	$1,396,000	$1,396,000	$1,038,000
Amortisation of hardware	$ 777,000	$ 386,000	$ 279,000	$ 406,500
TOTAL	$2,278,000	$1,782,000	$1,675,000	$1,444,500

In considering the four alternatives it would appear to be a matter of choosing between alternatives three and four. Alternative four will cost an additional $1,275,000 for capital equipment as compared to alternative three. However alternative four will cost $358,000 per annum less to operate when amortisation of hardware is removed from the operating costs. If the additional savings using alternative four are assumed constant for ten years, that is the depreciation period of the equipment, then discounted at 10% per annum and expressed at present values this amounts to additional savings of $2,199,752. Thus after deducting the additional capital cost of alternative four there are additional savings of $924,752 if the fourth method is used. However as the user population increases alternative three will become more attractive in pure cost terms.